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PERCIVAL SHELDON RIDSDALE, Editor

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THIS BEAUTIFUL SPOT IS ON THE GREEN, AT KENDALL, MASSACHUSETTS, AND SHOWS THE TREATMENT OF A STREAM WHICH HAS PROVED TO BE A VALUABLE ASSET TO THE COMMUNITY. Photograph shown through courtesy of the F. A. Bartlett Company.

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COSTUMES OF STUDENT WORKERS

These young women are part of a class which received several months' training in practical forestry and lumbering before starting actual daily work on timberlands.

A FEATURE OF THE TRAINING OF WOMEN

The instruction received by the women workers fits them for certain kinds of lumber and forestry work in the future and many may take advantage of this.

INSTRUCTION IN FORESTRY

It was found that the class of women volunteering for forestry work learned quickly and became serviceable workers in a few weeks' time.

AMERICAN FORESTRY

VOL. XXV MAY, 1919 NO. 305

WAR'S DESTRUCTION OF BRITISH FORESTS

BY PERCIVAL SHELDON RIDSDALE

EDITOR OF AMERICAN FORESTRY MAGAZINE

This is the third of a series of articles on the effect of the Great War on the forests of Europe, articles based on information secured during a tour of Great Britain, France and Belgium in December, 1918, and January and Febuary, 1919, taken for the purpose of investigating war-time forest losses and of ascertaining how best America can aid in restoring the forests of our Allies.—Editor.

LONDON, February 8, 1919.

THE British navy must have coal. Without coal it is useless. British coal mines must have timber. Without timber they are useless. British forests and woodlands cannot provide all the timber needed for British mines. Therefore Great Britain knew early in the war that unless she could get pit timber, or mine timber as it is called in the United States, from nearby countries she could not keep her mines producing coal and without coal her navy was helpless.

The problem of obtaining pit timber was therefore the most serious forestry problem in Great Britain during the war. She met it by cutting fifty per cent, some 450,000 acres, of her productive timber land for pit timber and other war-time needs and by importation, hampered greatly by the submarine menace, from other countries. Furthermore. she would have cut all the trees in the United Kingdom if it had been possible to transport them to the saw mills. Transportation, due to the fact that every horse and every automobile was requisitioned when war broke out, was not to be had except where saw mills were close to forests and woodlands and this alone resulted in Great Britain having left now about half the forest and woodland acreage she had when the war started. The need for timber was so great, and the lack of British lumber workers so pronounced that Great Britain speedily realized her deficiencies as a producer of lumber. First she imported Belgian labor. This was not satisfactory. Then she tried Portuguese with better results but she did not make real progress either in labor or machinery until she secured forestry and lumber battalions from Canada and the saw mill unit organized and equipped in New England and sent over to Scotland for eighteen months' work.

Big saw mills were erected by the Canadians and the saw mill units took over portable mills. These helped wonderfully to supply some portion of the lumber needs and the remainder was imported. One hundred thousand tons of pit timber a month was demanded by the mines. Ultimately Great Britain was able to supply 40,000 tons of this and import from France 60,000 tons. Previous to accomplishing this some pit timber was secured from Sweden by means of a three-cornered agreement between Great Britain, Sweden and Germany.

The British knew the Swedes needed certain commodities that only they could furnish so they said to Sweden,

SEED FOR GREAT BRITAIN

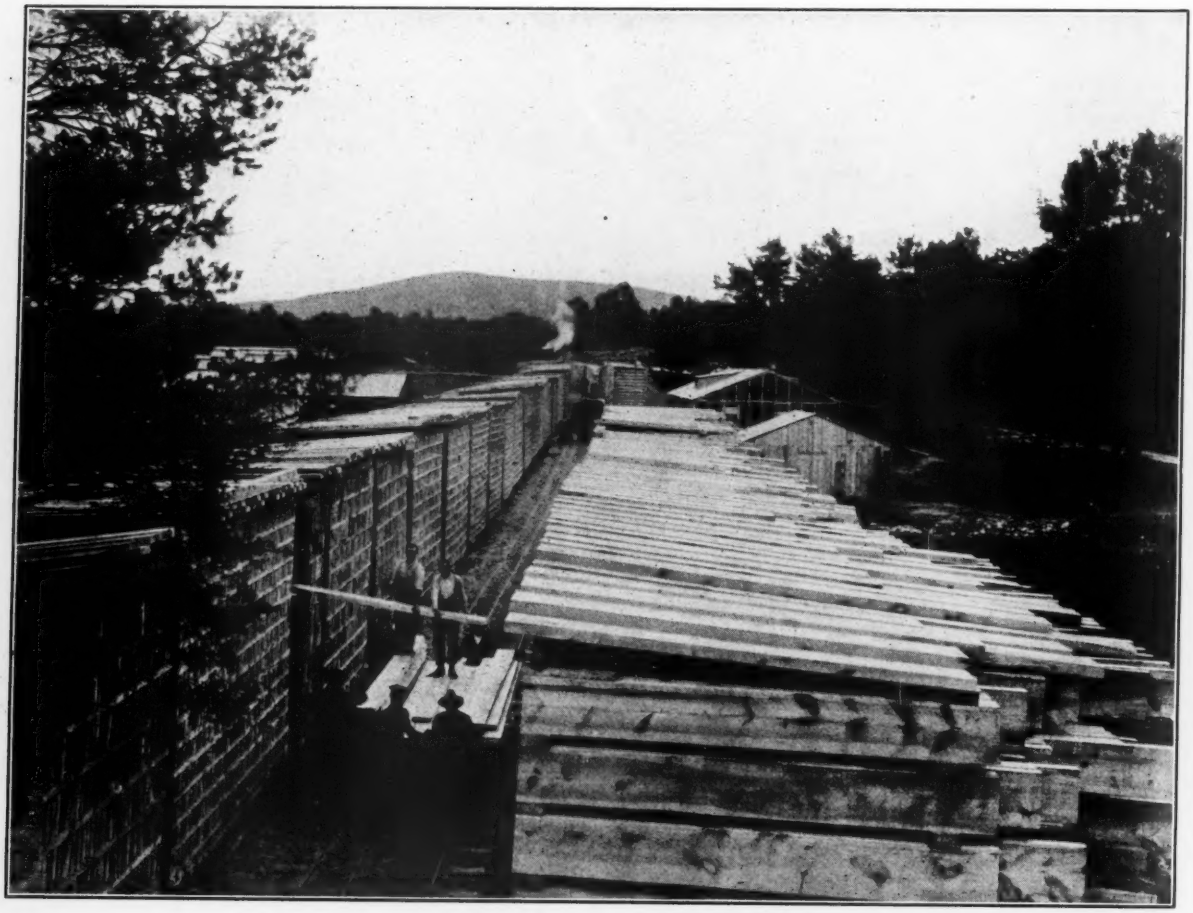
In order to restore her denuded forest lands and to plant waste land Great Britain needs forest tree seed. Douglas fir and Menzies Spruce is desired and as the seed crop in Great Britain is very small the American Forestry Association has secured a fund which will enable it to present a large quantity of the seed needed for replanting in the British Isles.

AMOUNT OF CUTTING

It is roughly estimated that England, Scotland and Wales, cut about 17,000,000 tons of green timber for war purposes in the three years 1916, 1917 and 1918. This amount is about twenty times the average annual pre-war fellings. This however is only part of loss since the woods had to be slaughtered irrespective of the interests of silviculture in order to keep the collieries and national industries supplied with the necessary timber. This often entailed cutting out suitable sizes for pit-wood and other requirements and ruining the entire future of the woods.

"We will furnish these to you if you send us pit-wood." Sweden replied, "But Germany will not permit our ships to carry pit-wood to England." Said the British, "Tell Germany that you will not supply her with iron ore which she needs, unless she permits you to send us pit timber and you to get in return these supplies you need from us." Sweden made the proposition, Germany adopted it and the three cornered bargain between the two enemies and a neutral was made.

Great Britain was thoroughly in earnest about cutting down every tree if it was needed. Windsor forest, beautiful, historic, thirty miles from London was sacrificed.



TIMBER STACKS AT A CANADIAN CAMP

This mill and lumber yard situated in the midst of a good-sized tract of timber land is typical of the way lumber operations were conducted in the British Isles.

A big Canadian saw mill was established in the heart of it and 4,700 of its 7,000 acres were cut. Practically all would have been cut had not the mill burned down when about two-thirds of its work was completed. In and about this forest the writer spent a day as the guest of Mr. M. C. Duchesne, honorary secretary of the Royal English Arboricultural Society and one of the best informed foresters of England.

During 1915 the British Government found that it was becoming increasingly difficult to obtain a sufficient supply of imported timber for the army in France and for the large developments in munition and other enterprises in Great Britain.

For a few months the authorities in Scotland, where much cutting was being done, endeavored by co-operation with the home timber trade to supplement the supply of sleepers and of trench timber which was required, but this assistance was quite inadequate, and after several conferences in London with the departments interested, it was decided to form the Home Grown Timber Committee which was done in November of 1915.

The Committee was authorized to purchase fabricated timber from the timber trade; purchase woodlands from the owners of estates, and carry out independently the exploitation of woodlands on behalf of the Government.

Immediate steps were taken to forward these objects but the Committee was faced with various difficulties—among others, the shortage of labor, and also the provision of plant. The owners of the estates, upon the whole, rose to the position, and with few exceptions willingly afforded the Committee the opportunity of selecting and purchasing their forest ground. The timber trade in Scotland, which was previously fairly well organized,

responded generously, but labor and machinery continued to be a source of anxiety.

For a few months Col. John Southerland acted as executive officer in Scotland and afterwards was asked to transfer to London, and became director of the Committee, with very ample powers. Finding that it was impossible to secure a sufficient number of lumbermen in Great Britain, Lord Selbourne, who was then Minister of Agriculture, approached Lord Kitchener, and as a result the latter cabled to Canada and asked the Dominion Government to provide a battalion of lumbermen. The latter government at once acquiesced, and in the month of June, 1916, the 224th Canadian Forestry Battalion arrived in England, fully equipped with saw mills and tools.

In the meantime the Committee was able to make arrangements for the provision of saw mills and of other plant in Great Britain and Belgian and Portuguese labor was utilized in some of the woods. The Committee was still working under extreme pressure, for the imported supplies were still decreasing, and Lord Kitchener agreed to demand another battalion of lumbermen from Canada. This battalion reached England towards the end of the year, and added materially to the output.

During the year, the Committee urged the employment of German prisoners of war, and gradually obtained limited supplies of these men for operations. Early in 1917 the Government had to reckon with a further decrease in the shipping available for timber and for other purposes, and as timber occupied a very large share of the tonnage it was decided that operations should be commenced in France, so that as little timber might be carried by sea as possible. In considering this matter it was necessary to remember that Great Britain was dependent upon France for the provision of pit-wood for the Welsh mines. These mines required about 100,000 tons per month of pit-wood, the greater bulk of which came from the district of Les Landes and Gironde by sea. The Government decided that it was essential that this supply should be decreased if possible by the provision of mine timber at home, and by this time the general supply of timber became critical, and the Government decided that as practically all the wood was required for military purposes the War Office should take control, and they accordingly appointed a Controller of Timber under that department. The Controller of Tim-

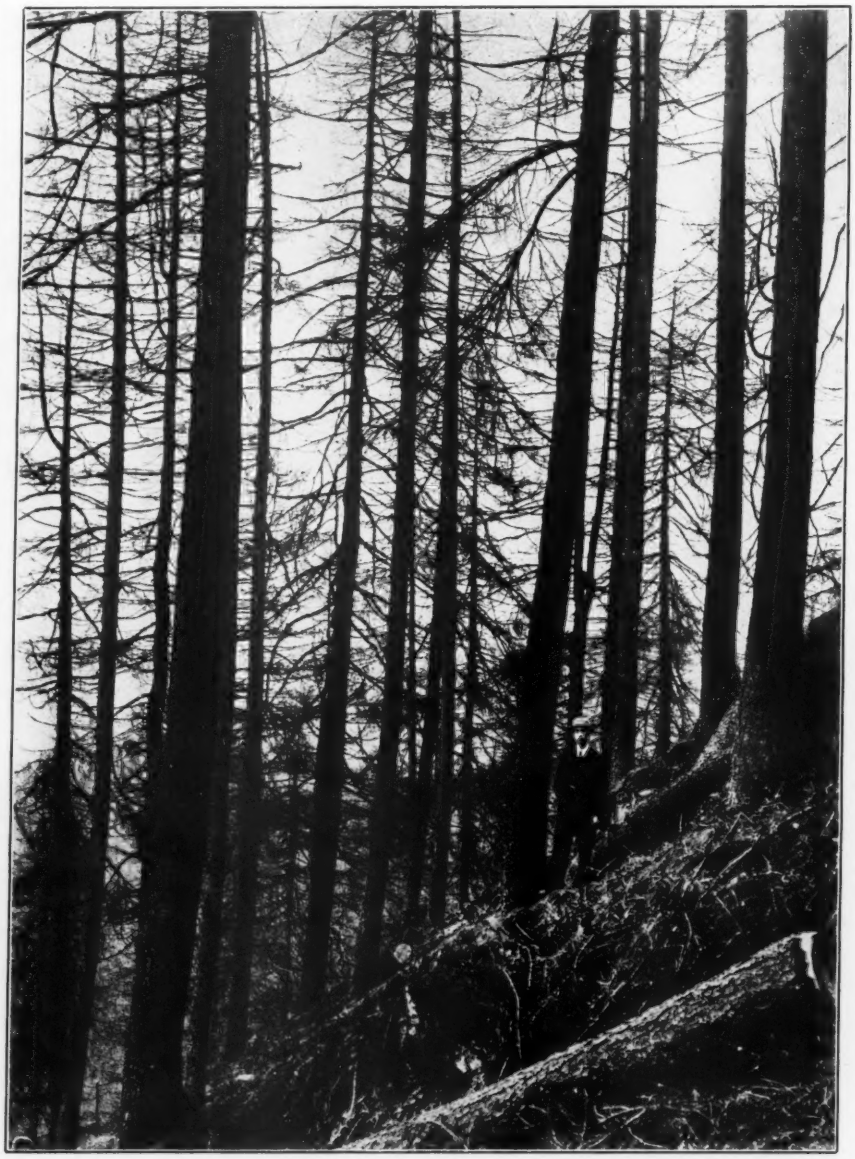
CANADIAN OPERATION IN SCOTLAND

A large mill at Knockando, Scotland, erected and operated by a Canadian forestry unit, secured timber from a large area by the use of lumber cables. This photograph shows one cable across the river Spey. The carriage is loaded and the method of operating the cable is clearly indicated.

ber was authorized to take charge of all operations at home, and to take possession of all the imported timber in the country. He was responsible for the distribution of all supplies, and was given the right to fix prices.

By this process the Home Grown Timber Committee was absorbed into the Timber Control. At that time the Timber Committee had altogether in operation 135 different exploitations in Great Britain, as also 25 exploitations by the two Canadian Forestry Battalions. The development during this period of the supply of pit-wood was such that the imports from France were reduced by 40,000 tons per month.

The War Office and the Controller of Timber in the meantime applied for further assistance from Canada, but these men were really asked for with a view of their being transferred to France. Up till this time it was not possible to commandeer forests, and as encroachments upon them were becoming somewhat serious, and as time was of consequence, the Government authorized the Controller to take such forests as he was advised to select, and the owners were paid, failing mutual agreement, the value of them as fixed by an independent commission. At the end of about three months the Control of Timber was transferred from the War Office to the Board of Trade, and various alterations and improvements were arranged in the administration.



A STAND OF LARCH

This larch at Birnam Hill, Dunkeld, Scotland, is at an elevation of 350 feet. Much of the felling was of stands similar to this.

Meantime German prisoners and further Canadian lumbermen were enlisted in the work, and at the date of the armistice England had purchased about 175,000 acres and Scotland about 125,000 acres of timber land.

In addition to the above there was a considerable area of wood cut in the first year of the war, of which no accurate record can be obtained, and altogether probably about 400,000 or 450,000 acres have been felled in consequence of the war.

As to production during the period, the departments concerned apparently have produced about 18 million cubic feet of timber, and the Board about 280 million cubic feet.

A statement of the labor employed at the date of the armistice by the Timber Supply Department in England, Wales and Scotland, is as follows: British subjects, men, 7,717; women, 1,734; Canadians, 6,686; German prisoners of war, 3,486; Portuguese, 1,926; Newfoundlanders, 541; Finns, 618; Danes, 391; other nationalities, 25; making a total of 23,124.

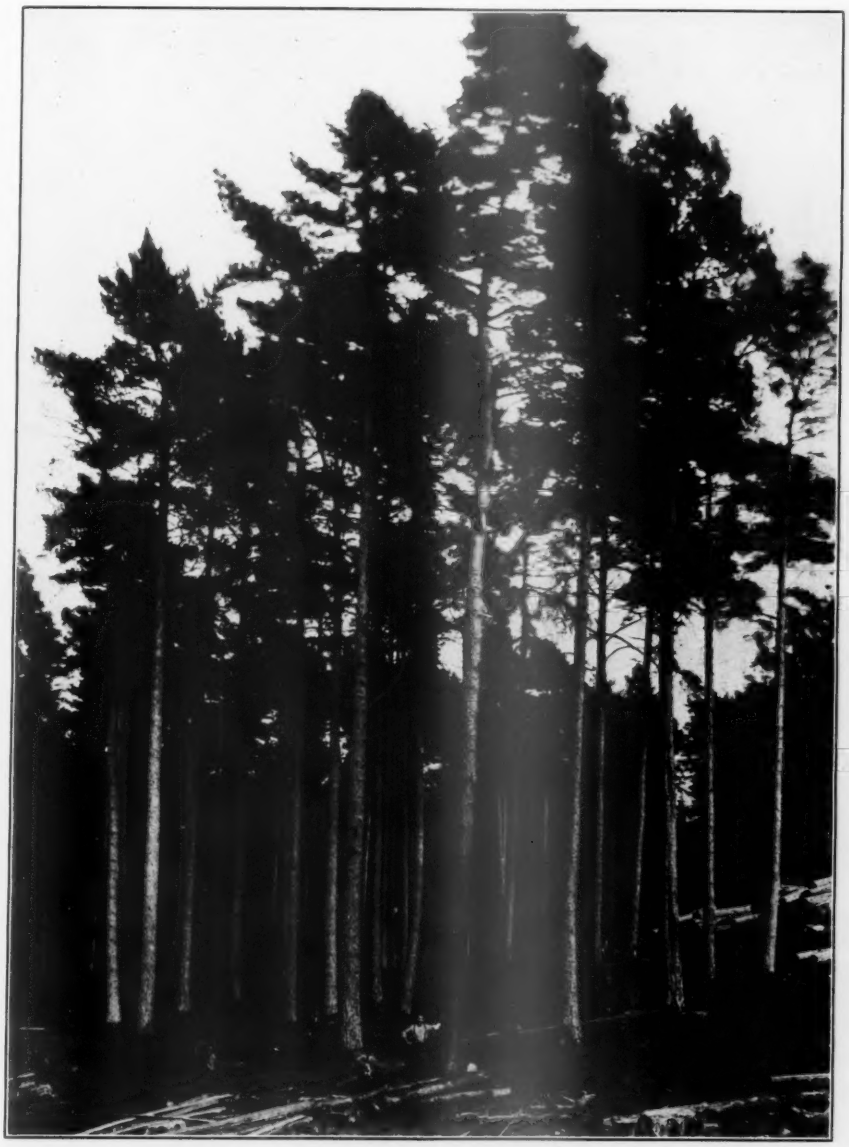
A. P. Long, Divisional Forest Officer for the three South Eastern Counties of England, says of the production for war purposes: "We were subject at all times to particularly heavy demands as the conditions at the front called for, and as an instance I may mention that early in 1918 owing to an exceptional call there were despatched from this Division no fewer than

68 trucks of sawn timber per day to France alone for a period of six weeks or more, other Divisions also sending their share.

"The figures for pit-wood, barbed wire pickets defence poles and telegraph poles and other round timber are not available on account of the difficulty in collating the different classes of material and the different systems of returns throughout the country. But it may be said that the production also was increased enormously so that, in spite of the severe restriction of imports, the country generally, including the timber merchants, kept abreast of the requirements.

"Some idea of the extent of this section of the work may be gained from the fact that in one week the South Wales Division railed no less than 8,000 tons of pit-wood direct from the woods.

"I should say that in round timber our principal demand was for pickets and defence poles owing to the fact that the South East of England was one huge armed camp and their requirements were enormous as well as those for France. In the output of this class of material this Division also supplied its fair share, as you may gather from the fact that last spring we were called upon to supply 569,000 pickets in two months and this was about one-half of one huge order."



A TYPICAL STAND OF SCOTCH PINE

This timber situated near Orton in Morayshire, Scotland, indicates the size and the character of the stands felled by imported lumbermen operating in Scotland.

WHAT THE WAR HAS TAUGHT

The Earl of Selborne, an authority on forestry, made this very frank statement, "There is no country in which forestry has been more neglected than it has in the British Isles. Now the experience of the war has brought home at last, even to the Government of this country, the immense importance of forestry. We were dependent before the war upon imported timber to an enormous proportion of our annual requirement, not only for all building purposes, but for all pit-props in our mines, and, as every owner of woodlands knows, we who own woodlands found it very difficult to sell our product, however good in quality, for any reasonable price before the war. Now, suddenly in the war, the Government discovered that it is a very dangerous thing to be dependent upon oversea supplies. The shipping problem early became acute, and it was soon seen that a very large proportion of our tonnage was engaged in bringing timber to this country—timber for building, timber for mines, and timber for paper making. Very early they had to begin to curtail the supply of tonnage used for this purpose; they began to look about and see what there was in the British Isles that could be used. They found a great deal more than anybody believed existed here, and almost all of it has been found to be of high quality, to be wholly suit-

able for construction purposes and for pit-props, and you will remember before the war the timber trade was constantly telling us that our products were not equal to foreign goods for those purposes. It was not true, we didn't believe it to be true at the time, and the experience of the war has shown that it is not true; and although, of course, a great deal of the timber that has been cut has been used green and unseasoned, owing to the haste with which its utilization has been required, yet it has been proved to be of fine quality. It is no exaggeration to say that if it had not been for what landowners of this country have done in the way of planting in past years, not only without any encouragement from the Government, but in the face of great discouragement of every kind, this country could not have carried on the war.

"Now, what is the position after the war? Practically we may say that the supply of coniferous timber is exhausted. Everything that could be possibly utilized in the way of coniferous timber will be utilized, before the period of a normal supply of shipping for imports after the war has been restored. There will be no coniferous timber in this country, except very young plantations, and comparatively few of them. There will have been great inroads made upon our ash, the supply of oak will not have been very materially impaired, but such trees as poplars and certain classes of elm will have been largely cut into, and the *problem of reafforestation will at once become acute.*

British Official Photograph

BRITISH OPERATION IN A FRENCH FOREST

Some sixty thousand tons of pit-wood were cut by the British in the French forests and were shipped to England for use in the mines. The photograph shows a member of a South African labor unit.

"If we were caught—which God forbid—in any war of this magnitude thirty years hence, and there had been no replanting on a sufficient scale, the country would be in a very bad position from the very beginning. So far as we can foresee, it would be impossible to keep our mines going on imported pit-props. Therefore, as a mere measure of national safety, apart altogether from the importance of the forestry industry in any civilized country, it has certainly become necessary for the Government itself to become the owners of forests, and the planter of forests, and to establish a Forest Authority which would own millions of acres, and, gradually, under a proper and well-thought-out system of rotation, establish forests on the French or German model."

HISTORY OF BRITISH FORESTS

In order to obtain a clear idea of the condition of forestry in the United Kingdom at the outbreak of the war it is necessary to know something of its history during the last century, for it was chiefly within that period that the woods felled during the war were planted and tended. From the middle ages onwards the State attempted to promote the cultivation of timber by legislative methods, but contrary to the custom on the continent of Europe, a very small proportion (less than 3 per cent) of the area of woods in Great Britain remained under State control. The pre-war condition of British woods was therefore the result of the action of economic and social forces on which the State has had little direct influence. It had been profoundly affected by the fact that unlimited supplies of cheap imported timber were available during the greater part of the 19th century, while the steady rise in prices which marked its close had, when war broke out, only begun to affect the management of British woods.

Both English and Irish private woods of the early 19th century consisted mainly of hardwoods, remnants of the once extensive indigenous forests. In Scotland only were parts of the indigenous forests coniferous, but by the beginning of the last century they had been reduced to an inconsiderable area. Private woods supplied the greater part of the material required for rural and gen-

eral purposes, and owing to the demand for small wood and for oak bark for tanning purposes coppice woods were highly remunerative. It would appear that a considerable revival of interest in forestry, probably more from an aesthetic than a practical standpoint, took place towards the end of the 18th century and continued until the middle of the 19th century.

Towards the end of the 18th century the growing shortage of Navy timber led for a time to an active planting programme by the Crown. It was then determined to plant with oak an area of about 100,000 acres, sufficient to meet the estimated requirements of the Navy. The work was entrusted to the Commissioners of Woods and Forests, who were to find land for the purpose chiefly in the ancient Royal Forests. In 1823 the Commissioners were able to report that nearly 52,000 acres were under timber, but although some planting and replanting went on steadily, the total area had not increased by 1848. A revival of planting took place in the New Forest for a few years after the Deer Removal Act of 1851, but thereafter, as interest in wooden ships declined, interest in the Crown woods declined also, and when forestry again began to receive public attention, about 1880, the importance of Navy timber had disappeared completely. In its place, questions bearing on the more profitable management of the Crown woods, the utilization of waste land and the production of coniferous timber became prominent. The operations of the earlier

COL. JOHN SUTHERLAND, B. F. C.
British member of the Comite Interallie des Bois de Guerre, stationed at Paris to represent the British Forestry Corps.

British Official Photograph BRITISH FORESTRY CAMP IN FRANCE

This camp and mill combined is typical of British forestry operations on the western front in France while the character of the French forests leased and cut by the troops is indicated by the forest on the ridge.

part of last century have borne good fruits, for although the Crown woods were formerly managed chiefly with a view to producing hardwoods, and the more recent coniferous plantations are not old enough to yield merchantable timber, there have been set aside, in the New Forest and Windsor woods alone, since the outbreak of war, and are felled or in process of felling some three and a half million cubic feet of large coniferous timber and approximately one hundred thousand tons of pitwood.

FUTURE FOREST ACTIVITY

Great as has been the sacrifice of forests and woodlands by Great Britain it has not been in vain for knowledge of her weakness in timber resources forced upon her by the war has led to a movement that assures more forest activity in the future than she has ever experienced in the past. Plans have already been made and are rapidly nearing completion, for the reforestation of her cut over areas and for the planting of great areas of waste land suitable for nothing except the growing of timber. A committee of distinguished men, after a careful survey of the situation, has submitted to Parliament a report and recommendations which undoubtedly will be the basis of the future forestry program in the British Isles. This committee was commissioned to consider and report upon the best means of conserving and developing the woodland and forestry resources of the United Kingdom having regard to the experience gained during the war.

In view of the fact that a national lumber and forest policy for the United States is now being earnestly advocated it is well worth noting that this British forestry reconstruction committee in its report to Parliament states that the British forest policy has been totally inadequate; that dependence on imported timber is a grave source of weakness in war; that the supplies of timber even in times of peace, are precarious and lie too much outside the Empire. These conclusions, the committee states, are not only the best reasons for extensive planting but afforestation would increase the productiveness and population of large areas of the British Isles which are now little better than waste.

The committee presents a summary of its main conclusions upon the forestry situation in Great Britain by saying:

(1) The total area under woodland in the United Kingdom before the war was estimated at three million acres, the annual yield from which is believed to have been forty-five million cubic feet, or about one-third of what it should have been under correct silvicultural management. These figures indicate the unsatisfactory condition of British and Irish woods as at present managed, and prove the urgency of remedial measures in the interests of national economy.

British Official Photograph CHARCOAL FOR THE BRITISH TRENCHES

The charcoal made in the French forests leased by the British were packed in bags by Indian labor troops and sent to the front on the narrow guage railways so generally used by the armies for transportation.

(2) During the five years preceding the war the average annual imports of timber similar in character to that produced in the British Isles were equivalent to five hundred and fifty million cubic feet of standing timber. The home production was therefore less than eight per cent of the consumption. The imports of timbers of all kinds during the years 1915 and 1916 were respectively three-quarters and two-thirds of the normal pre-war imports, and their cost for the two years was seventy-four million pounds, or thirty-seven millions in excess of their pre-war value. These imports absorbed seven million net tons of shipping, equivalent to approximately fourteen million tons dead weight.

(3) The area of land utilized for rough grazing, but capable of growing first-class coniferous timber of the same character as that imported, is not less than three and probably more than five million acres. Two million acres could be devoted to timber production without decreasing the home production of meat by more than 0.7 per cent, and if so used would ultimately afford employment to at least ten times the number of men now engaged on that area.

(4) Dependence on imported timber has proved a serious handicap in the conduct of the war. The United Kingdom cannot run the risk of future wars without safe-guarding its supplies of timber as every other Power that counts has already done.

(5) In order to render the United Kingdom independent of imported timber for three years in an emergency, it is necessary, while making due allowance for an improved yield from existing woods, to afforest 1,770,000 acres. Taking 80 years as the average rotation, we advise that two-thirds of the whole should be planted in the first 40 years. We consider that the quota to be planted in the first 10 years should, in view of the initial difficulties, be limited to 200,000 acres, of which we advise 150,000 acres should be planted by the State and 50,000 acres by public bodies and private individuals assisted by grants, or by co-operation between them and the State. The area to be planted by the State in subsequent years may be reduced in the same degree as private individuals come forward to undertake the work.

(6) It is not proposed to plant arable land, but a limited area of arable land should be acquired with the

A MILL OPERATED BY NEWFOUNDLANDERS

This mill and encampment at Craigoinean, Dunkeld, Scotland was a good sized operation, the extent of which is plainly shown by the photograph taken from the hill overlooking the mill.

forest sites wherever possible in order to provide small holdings for forest workers. Our proposals carry with them the important contingent advantage that they will cause large areas of the United Kingdom, now almost waste, to be put to their best economic use. They will also, if provision is made in time, afford the means for settling discharged soldiers on the land under healthy conditions.

(7) Forestry demands long views, but the first fruits are not so long delayed as many imagine. The policy of State afforestation which we recommend will begin to provide pit-wood, from the quicker-growing species on the better kinds of mountain land, from the 15th year onwards; by the 40th year the plantations made in the first ten years alone will contain sufficient timber to keep our pits supplied, in emergency, for two years on the scale of present consumption.

(8) The first essential is a Forest Authority equipped with funds and powers to survey, purchase, lease and plant land and generally to administer the areas acquired, with compulsory powers to be exercised, when needed, after due enquiry and the award of fair compensation. The care of forestry, now divided among several departments, should be centralized in this body.

(9) We recommend that the Authority should be authorized to make limited grants for every acre replanted or newly afforested during the first 10 years after the war by public bodies or private individuals; such plantations to be made in accordance with approved plans and conditions.

(10) We estimate the cost for the first 10 years at £3,425,000. It may be necessary to invest £15,000,000 altogether in this enterprise during the first 40 years. After that time the scheme should be self-supporting. The financial return depends on prices, wages, bank rates, etc., which are difficult to forecast. Forests are a national necessity; the country must have them even though they yield less than the current rate of interest on the capital invested. The whole sum involved is less than half the direct loss incurred during the years 1915 and 1916 through dependence on imported timber.

(11) The above proposals are framed in the interest of national safety, which requires that more timber should be grown in the British Isles. There remains a further

British Official Photograph

CHARCOAL KILNS NEAR THE BRITISH FRONT IN FRANCE

British soldiers attached to the forestry division making charcoal in one of the forests leased from France. This charcoal was used for warming the troops in the trenches.

question. The United Kingdom derives more than half its imported timber from virgin forests in foreign countries, which are steadily being depleted. Canada contains the only large reserves within the Empire. Unless arrangements can be made with the Dominion Government for the effectual conservation of these reserves, it is inevitable that provision should be made within the British Isles on a far larger scale than is here proposed for the purposes of defence. We consider that this question should be taken up at once with the Dominion Government."

British Official Photograph BRITISH FORESTRY SOLDIERS CUTTING WOOD IN FRANCE

The British Army needed quantities of lumber for barracks, trenches, dugouts and other military uses and several companies of lumbermen were kept busy supplying these needs by cuttings in forests leased from the French.

NEED OF A SINGLE AUTHORITY

General Lord Lovat, in command of the British Forestry Regiments and a member of the Forestry Reconstruction Committee, in speaking of the future development of forestry in the British Isles emphasizes the importance of a single forestry authority having complete charge of the work which it is planned to do.

Lord Lovat very frankly says the creation of a single forest authority is required:

"Firstly, and principally, to make a definite break with the past, to get out of the welter of conflicting authorities and to escape from the arena of party politics, Royal Commissions and amateur inquires.

"Secondly, to make it possible for an accredited authority not only to draw up a definite forestry policy for the British Isles, but also to set in motion the machinery for carrying it into effect.

"Thirdly, to constitute a body who can view the forestry situation in Great Britain as a whole, and decide on purely forestal grounds the conflicting claims of the various countries unbiased by local or political pressure.

"Fourthly, to constitute a body who, in time of war, could act with the Military Authorities to exploit both State and private forests for the benefit of the country.

He adds, "the first three points have been dealt with in the report of the Committee. It is only necessary to say about the fourth point that in France at the beginning of the war a central Forestry Authority existed, the resources of each forest were known; the transport facilities, railway sidings and light railways had all been studied in times of peace, with the result that the maximum of production was possible with the minimum of effort.

"Forest utilization in England at the beginning of the war presented a very different picture. It was twelve months before the Government improvised machinery to deal with the subject. By this time many of the skilled men had already enlisted. Mills were to be found without men, men were to be found without mills. Forest workers were badged and de-badged at uncertain intervals. Departments competed for labor, while German

prisoners, skilled in forest work, were unemployed for months, and, after their employment, tied down with such regulations as to make their work relatively unproductive.

"Even the responsibility for the organization on timber production was never vested in one authority for many consecutive months, but changed from the Board of Agriculture to the Office of Works, from the Office of Works to the War Office, and from the War Office to the Board of Trade. The fault for all this is to be found in lack of organization before the war. Nothing had been thought out, no authoritative body existed in whom the public had confidence. It was impossible to execute a survey of timber resources and build up an organization once the war had begun.

A REAL HUSKY CHOPPER

After instruction and practice women were able to fell timber quickly and cleverly. This young woman was a particularly capable wielder of the ax.

"It is not, however, with the past but with the future that the nation is concerned. How to make a forest policy, how to carry it out, and, if the occasion arises, use the resources that the State has built up for the State's best advantage.

"Both in precept and practice the countries of Europe, the teachings of all recognized authorities and the findings of the principal arboricultural societies, not only in Great Britain but elsewhere, have agreed that a forest authority is a necessary part of State afforestation.

"It is difficult to see why Great Britain, who has her State forests and forest policy still to create, should be an exception to this generally recognized rule. It is certainly not on the experiences of the past that she can base any claim to be an exception from the methods that have been found to be necessary elsewhere."

WOMEN WORKERS IN FORESTS

The lack of labor made it necessary to employ a number of women in forestry work. The women so placed were drafted from the working classes, and they had not undergone any course of training preparatory to their taking up employment in forestry. Many of them were unemployed women, who were idle because of slackness in certain industries, fishing, spinning, mills, etc.

COSTUMES OF WOMEN WORKERS

This sensible costume of shirt, trousers, puttees and heavy shoes was found most suitable for the women workers in the woods.

Mr. G. P. Gordon, in reporting on the results of this action, says: "Experience of working squads of these women proved that this type of worker without training is not altogether suited for rural work on the land. Although in many cases good individuals and good squads were encountered, the average individual was too unsettled to obtain the maximum value from her work. It is thought that women of this class, for true economy, must be constantly in touch with their own homes, as they were found to be less adaptable than more intelligent

and better educated women. Further, it was found that the supervision of this class of worker was somewhat costly, as initiative so necessary in land work was almost entirely lacking.

"A problem which had a considerable influence on the efficiency of these workers was the question of dress. It was found that ordinary foot wear was quite unsuitable, and experiments were made with clogs, high boots, leggings, etc., and finally it was decided that stout boots and leggings were the most useful. The ordinary apparel

STRENGTH REQUIRED FOR THIS LABOR

It was found that women could stand harder work than was anticipated and it is apparent the labor was far from light.

of the women was found to be unsuited for wet weather, and experiments were made with waterproof skirts, which were not, however, found to be very successful. In nursery work skirts are always a drawback, as they damage young plants in the nursery lines, and also break down the edges of seed beds. In addition, in wet undergrowth they are a decided hindrance to freedom of action. For outdoor land work it is essential that women have the equivalent of a man's jacket, which can be donned during a shower and cast off in hot weather or for strenuous work.

"The question of housing this type of woman away from her home was one which was attended with many and varied difficulties. In the first instance comparatively few of the women were able to do for themselves properly. Further, although they had their food prepared for them, they were not able to purchase food in a thrifty manner, and therefore had to suffer many discomforts. Probably as a result of this the women were difficult to control, and were somewhat unreliable as regards time-keeping.

"A certain allowance must of course be made, due to

MEASURING THE FELLED TREE

The women workers were able not only to fell a tree but also to report on the amount of lumber to be secured from it.

the fact that the work and the conditions of labor were entirely new to the women, most of whom were unacquainted with outdoor work and rural conditions generally.

"The experience gained during the years 1915 and 1916 forced one to the conclusion that this class of untrained labor was not the most efficient for the purpose in view. An attempt was therefore made to partially train the women to at least a knowledge of out-door conditions. In this connection the West of Scotland College of Agriculture organized at Kilmarnock in 1917, a scheme for this purpose. The women went into residence at the College farm for a few weeks, and were thereafter drafted to forestry work on different estates throughout Scotland. There was no attempt made to train the women technically in forestry work, but they obtained an opportunity of experiencing land conditions. It was found that the type of women willing to undergo this period of probation was a more intelligent one than those form-

SHE FACED THE CAMERA

Nevertheless she was no fanciful worker but able to do her share of a day's labor in a highly efficient manner.

erly dealt with. In addition she was more adaptable, more reliable, and gave better satisfaction to her employer. These women were drafted to various kinds of forestry work, *e. g.*, seed collection, forest nursery work, planting work, draining, bark peeling, timber felling, brushwood burning, and bracken cutting.

"Although the period of instruction is too short almost to warrant the term training being used, reports from the employers of these women show that the scheme has been more than justified. Their work has included draining, planting, fencing, nursery work of all kinds, felling timber, 'snedding' and cross-cutting timber, measuring timber, and saw mill work. Further, they have engaged in general estate work, bark-peeling, bracken cutting, clearing up and burning brushwood. During hay time and harvest they have been drafted to this work, which has the advantage of giving that variety which experience shows is so necessary in women's work on the land.

"The effect on the women of this kind of work, has been noticed, and in no case has it been found to be detrimental. They have all been able for the work undertaken, and have quickly become fairly expert at it. Their health has, in all cases, materially improved with the out-door occupation, and this has been so even in cases where they have been employed all winter."

STRATEGIC IMPORTANCE OF FORESTS IN THE WAR

BY J. DEMORLAINE

Translated by Samuel T. Dana, U. S. Forest Service, from *Revue des Eaux et Forets,* Paris, France, February, 1919, and revised to date by Percival S. Ridsdale, Editor of AMERICAN FORESTRY.

"WOODS are an ornament in peace and a fortification in war," wrote Cicero two thousand years ago. Was he thinking at the time of the barbarian invasions which menaced the Roman world and which the destruction of the forests of Gaul by the legions of Cæsar succeeded only momentarily in arresting? Certainly in uttering this aphorism, eternally true and now more than ever justified, the prince of Latin orators could not foresee the war in which we have been engaged for more than four years, and in which the woods and forests of France have perhaps played as vital a role as our cannon. It is to wood—wood in all its forms, utilized behind, within, and in front of our trenches—that we owed our ability, in spite of inferior numbers, to hold in check the barbarian hordes invading our native soil.

No one could have anticipated that modern war—prepared for, in fact, as a war wholly of movement—would have become for long months a war of position, transforming our front, from the North to the East, into a vast entrenched camp, and demanding wood in the most diverse forms, from entanglement stakes or telephone pole cross-arms, to timbers buried several feet below ground,—from the smallest coppice pole to the most majestic veteran of the forest. Our French forests were fortunately very rich. Thanks to the conservative foresight of our foresters since the organization of the present conscientious and devoted forest administration, they have been able to satisfy all needs in spite of the important and more and more numerous demands of the army.

While this is not the chief role which foresters and military men had believed the forests would play if war, always menacing, should unchain its ravages on our country, can anyone say that they have failed to measure up to all the expectations which the facts of history, classic through repetition since the most remote times, might arouse? By no means; our woods and our forests have not only given us unreservedly of their riches to enable us to hold our own against the invader, but they have also played a no less glorious part in the episodes of this unforgetable war, which will unquestionably remain the most terrible and most monstrous war of modern times.

In the days now far distant when we sat on the benches of the Forestry School at Nancy, our comrades will recall that we were taught that our woods and forests would play a dual role in war. In proportion to their extent they could have, on the one hand, a tactical influence as points of support in particular corners of the field of battle, while on the other hand, when affording a continuance screen, they could play a most important and valuable part as a mask for widespread movements and for important maneuvers of large masses of troops.

It is considerations of this sort that for four years we have expounded to our pupils at the National Institute of Agronomy. How many of them have been able to verify in person the truth of these theories; how many have unhappily wet with their blood the soil of a wood the tactical importance of which they fully understood, and which it had been their mission to defend at any price?

This conception of the military role of forests, based as it is upon the numerous and exact data of history, should not and can not be minimized when we consider this latest war. Is it necessary to recall the names, forever celebrated, of the woods of le Pretre, of la Grurie, and of Mortemart, where thousands of our soldiers were cut to pieces by shells in defending the approach against the repeated attacks of the infamous Boche? Those of our men who fought to the death under the shade of these unfortunate woods—which are now themselves gone and for so long a time—appreciated too well their tactical value!

Can we minimize the strategic value of our more continuous forests, any more than we can deny that the smaller patches, often only a few hundred acres in extent and without a name until baptized with some title suggested by their shape—"square," "trianglar," "star-shaped woods"—have played a truly military role in the defense of our front? Let no one be so deceived. Our great French forests, from the Vosges to the sea, have often stripped the invader of his offensive powers.

In 1914 the German armies of the East are held up on the crest of the Vosges from Mulhouse to the forests of Parroy before Luneville. The great forests of Alsace, of the Vosges, and of Lorraine permitted us to regroup our forces. Epinal was saved. At the same time the defense of the Grand Couronne of Nancy succeeded in supporting itself in the important forests of Champenoux and of the plateau of Haye.

When, after having jumped the defiles of the Islettes and of the Chalade in the Argonne, the victorious hordes tried to menace our lines of communication in the rear while themselves advancing on the Marne, it was again the great forests of Trois-Fontaines, in front of Saint-

Photograph by Underwood and Underwood

NORTHERN FRANCE—A BATTLE-SCARRED AREA, AS IT APPEARS TODAY

A scene at sunset on the National Road between Soissons and Chavignis, at one time the very center in the turmoil of battle. These skeletons—mute and pathetic witnesses—are all that remain of the once magnificent avenue of trees which lined the road.

Dizier, which saved this important nucleus of roads and railways and enabled us to prevent the Boche from reaching the Marne from above Vitry-le-Francois.

To the west the army of von Kluck, seeking to isolate the bulk of the French army in front of the capital and thinking to enter Paris without striking a blow, appeared to forget the dense defensive screen constituted by the forests of Villers-Cotterets and of Compiegne. Thanks to this the army of Manoury accomplished its rapid movement and fell upon the left flank of the German army. Paris, one can say without exaggeration, was saved the first time by its forests.

It is thanks to these again in July, 1918, that Marshal Foch, supporting himself on the projections of the forest of Villers-Cotterets and of Campiegne worked out the offensive that later developed into the brilliant victory that we admire today, and that gave our arms the decision in this unforgettable campaign. The great forests of Retz (Villers-Cotterets) and Guise (Compiegne)—advanced bastions in the defense of the entrenched camp of Paris

If we look at things from the point of view of the enemy, we see that the important forests of Saint-Gobain permitted him to retard the victorious advance of our troops and to defend the important stronghold of Laon, which made a deeper and deeper pocket in our steadily advancing line. In front of Mangin's army the German retreat was favored by the wooded nature of the country which is covered by a dense screen of forest. The movement of transportable material and of enemy units was well protected by the shade of our forests, behind which the Boche found a protective shelter. And if one stops to look at the map, without which one may easily go astray, he will find between the Sambre and the Moselle the immense screen of forests which succeeded in 1914 in masking the concentration of the 3rd, 4th, and 5th German armies.

According to General Malleterre: "North of the Oise, the Serre, and the Aisne, the forests of Mormal, Nouvion, Richeval, Signy Mazarin, Saint-Pierre Mont, and Dieulet, the woods of the northern Argonne to the north of

A WOODED SECTION OF THE BRITISH FRONT IN FLANDERS

Here is a photograph which shows the effect of sustained shell fire on a section of wooded country. It shows British troops advancing over newly captured ground from which the Huns have been driven by artillery fire.

—permitted the Generalissimo and his lieutenants to mass fresh divisions and important groups of artillery out of sight of the enemy's aviators. The latter sought to jump the gap at Soissons between Compiegne and Villers-Cotterets. From the forests of Compiegne, of Pierrefonds, and of Villers-Cotterets our counter attacks issued in force, consciously supported by artillery well secreted from all indiscreet reconnaissance. Paris was saved again! The capital may well be grateful to the forests that surround it.

Grandpre, then to the east of the Meuse the forest of Woevre, the woods of Damvillers and the forest of Moyeuvre, surrounding Briey, form an almost continuous cover on the accentuated hills. The great wooded region of the Ardennes shows itself in the north, between the Sambre and the Meuse, as an extended mass of sombre woods—the forests of Trelon and Saint Michel. East of the Meuse the forests spreads out indefinitely over the vast plateau of the Ardennes up to Moselle. Mons, Maubeuge, Mezieres, Sedan, Montmedy, Longwy,

and Briey mark the vast and undulating line of forest in Belgium and France."

It is in this great zone, and under the protection of the immense forests of our northern frontier, that Ludendorff tried to direct the retreat of his armies when once forced to abandon the forest of Saint Gobain, the central bulwark of the Hindenburg line. As was foreseen, the forests of the Ardennes offered to Ludendorff a favorable ground for the establishment of a new center of resistance around which the German right wing could pivot. The resumption of our offensive in the north surprised him. Von Hutier received the order to vacate the pocket of the Laon and to abandon the precious support of the forest of St. Gobain. He concentrated all his forces on the plateau which follows the canal from the Oise to the Sambre, supporting himself in the rear on the forests of Mormal and the Nouvion,—that immense green block which the map shows us to the north of the Cateau. The forest of Mormal, more than 9 miles long and about 6 miles deep, constituted for the enemy a point of solid support and a formidable obstacle to the advance of the Allied armies. It was necessary to make the Boche evacuate this dangerous obstacle by well planned turning movements. The British thought that this would be too long a piece of work, and audaciously resolved to force the issue. The army of Rawlinson turned at the same time the powerful defense formed by the forest of Andigny, which the troops of the army of Debeney occupied. On November 4 the great green block on which the Boche had counted to retard our offensive fell into our hands. Far from disproving the strategic importance of the forests, these facts confirm it. Only the heroism of our poilus kept it from being of great and prolonged value to the enemy.

What more powerful demonstration could be wished of the strategic importance of forests in war? Appreciated in time of peace by the tourist and the hunter, who find in their charming walks an easy and agreeable pastime, the forests have played a glorious and momentous part in the campaign.

This should not be forgotten when we now think of repairing the immense disasters and the bleeding wounds suffered by these majestic forests. As evidence of our gratitude for the part the forests have played, let us leave to nature, intelligently aided by the work of foresters, the task of patiently reconstructing them. Nature is a good mother; she knows how to do things quickly and well. Let us assist, not hinder her, in her work.

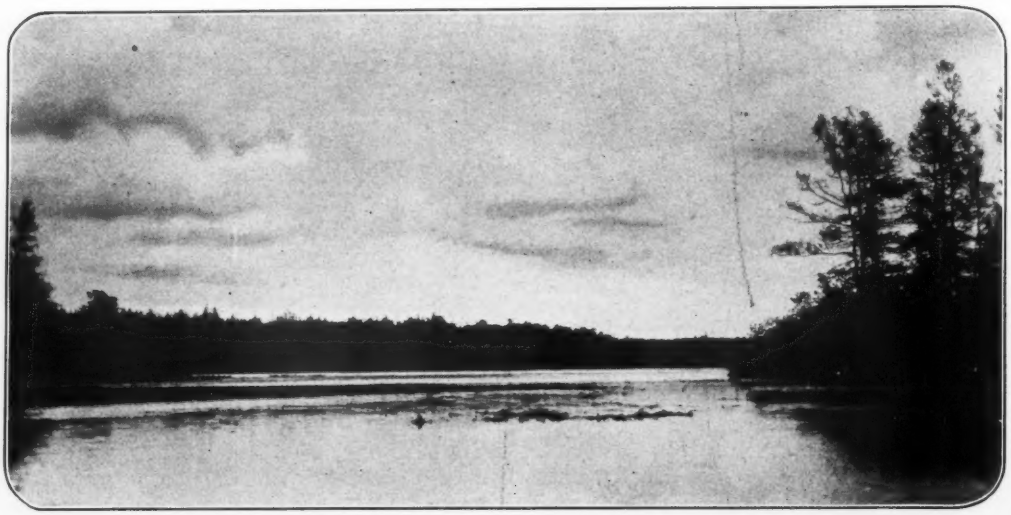
FOREST DESTRUCTION ALONG THE FIGHTING LINE

This before the war was a well wooded ridge, the famous Messines Ridge from which the British drove the Boche by terrific shell fire. The photograph shows what is left of the trees after the several tornadoes of shell, machine gun and rifle fire which swept over the ridge.

It is not necessary to ask these forests—already bled white, to furnish wood of every nature for our front lines, torn by shot, often devastated thoughtlessly by troops—to furnish in increased quantity the necessary materials for the reconstruction of our liberated regions. The Boche must pay back in kind the wood which he has forced us to spend without stint in opposing the fury of the invader. Our French forests, and particularly our beautiful forests of Ile-de-France, ought to enjoy a long and well merited rest from the devastating ax and, above all, let us not give aid to their enemies by allowing the hunting of game, which the war has stopped. The natural balance in the animal life of the forest has been re-established by the war itself. Let us not favor the return of the rodent under the pretext of restoring hunting, often so harmful to the regeneration of our high forests. These massive stands, after the long and hard campaign, need a long and well earned rest! They have had their long months of suffering; let us leave them to refresh themselves in perfect peace. By their strategic importance, which our great military chiefs have not forgotten, they have saved France. In return let us permit them to recover themselves. Failure to aid them in healing their numerous and glorious wounds would be not only a crime of treason against the country, it would show how poorly we understand the real interests of the nation.

"In the depth of the wood the country has its heart." This should never be forgotten.

Spring In Maryland



The valleys call to the mountain tops and the mountains to the plain,
The east wind whispers to the Bay and Kent hears the refrain.
The whip-poor-will lends a mystic thrill to the chanting of the marsh,
And the lonely loon stills the insects' croon with a summons loud and harsh.

The tang of the Severn calls to the rose and the Bluebird hears the cry;
In Talbot's lanes the cardinal sings, and is answered from the sky.
A magic dew wakes the lilac, too; the daffodil answers the thrush;
The burnished moon sets the swamps in tune, till the willows bid them hush.

And the shattered dreams of the winter are soothed in the cedar's balm;
The blue sky beams on a fairy land, and reflects the Chesapeake's calm.
The sky and flowers of Nature's bowers, the hills and the eastern strand,
The birds, the sun, and Man as one, greet the spring in Maryland.

—By John Ferguson.

MONUMENTS WITH A MEANING

THE American doughboy had an important share in making over the map of Europe. Now, but in a different way, he is making over his own country. This is coming about through the memorial plans which are being worked out in hundreds of places throughout the United States.

The memorials of this war are not going to be the "meaningless mausoleums and monuments" which the late Colonel Roosevelt one time condemned: but they will in most instances typify the service and the sacrifice which the nation's fighters endured in order that others might enjoy greater happiness and peace. The men who gave their lives for their country would ask no better, no nobler, no more lasting memorial than that they live in the hearts of their countrymen. This is being accomplished through the parks, community centers, memorial drives and roadways and similar city, town and county betterment plans that are being worked out.

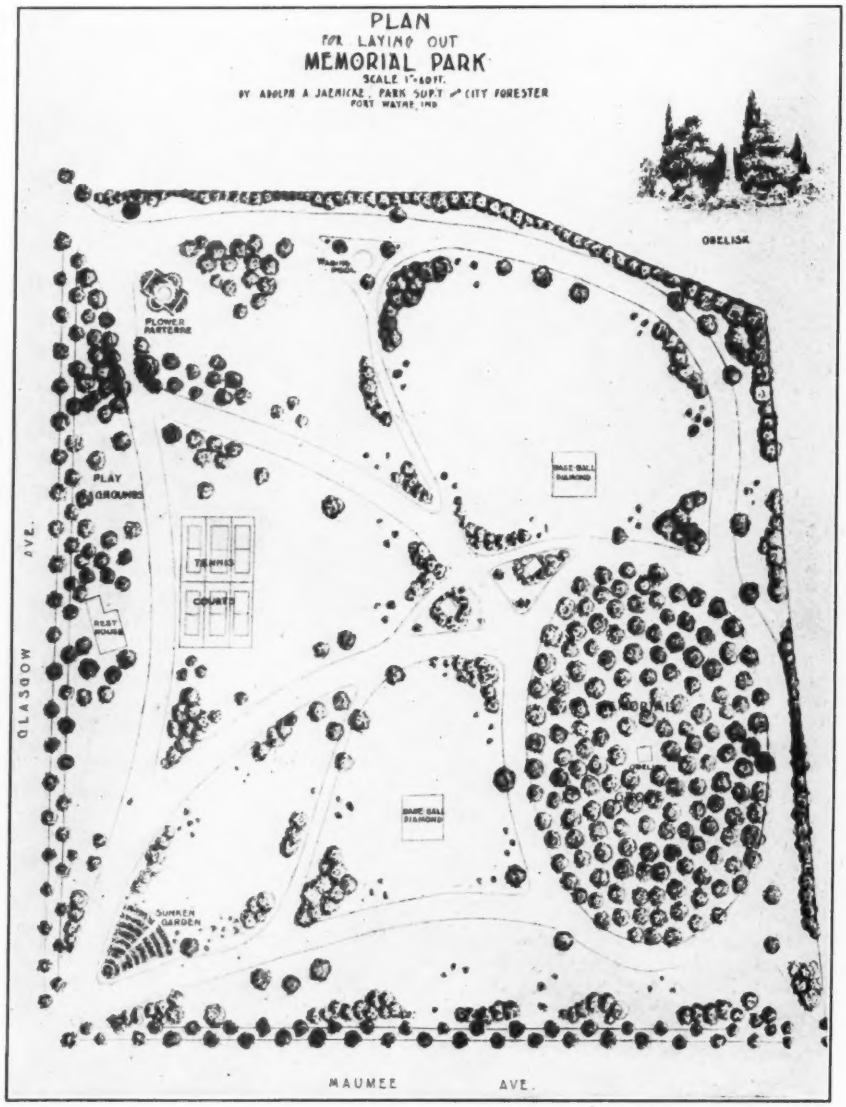
Tree planting is a feature of most of the memorials which communities all over the country are erecting to their soldier and sailor dead, or to those who offered their services. It is combined in park and city beautification systems, in the laying out of Victory driveways and in the setting for other forms of memorial. All this is in line with the suggestion of the American Forestry Association that trees be planted as tributes to the sacrifices of the country's heroes.

Arbor Day took on a meaning in many states this year which it has not possessed since its first observance in the United States more than forty years ago. It was made the occasion in many places for dedication of the trees planted to men who had paid the supreme sacrifice, as well as to some of the leading figures in the war, including President Wilson, General Foch, General Pershing, and others whom the community took this fitting opportunity to honor. In Pennsylvania, for instance, it was selected for the setting out in one of the state forests of eighty trees in honor of Dr. J. T. Rothrock, the "father of forestry" in that state and a vice-president of the American Forestry Association. Arbor Day was very

THE "FATHER OF FORESTRY" IN PENNSYLVANIA—DR. J. T. ROTHROCK, OF WEST CHESTER

Known, loved and honored as a pioneer in forestry, not only in his own state but all over the country. Dr. Rothrock, who is a vice-president of the American Forestry Association, recently celebrated his eightieth birthday, and on Arbor Day the State planted eighty trees in his honor.

generally observed throughout Ohio, the school children being particularly active in planting trees in school grounds to former students who had gone into the service. In Cincinnati among the schools which planted trees on that day were Whitter, Bond, Hill, Westwood, Oakley, Vine, Washington, Carson, Opportunity Farm school. At Millville, New Jersey, each of eight schools planted a tree in one of the city plazas. Simple and impressive dedicatory services were held as a rule with the plantings. One of the most touching of these was that at Burlington, New Jersey, where the baby hand of little Eleanor MacFarland tenderly clutched the branches of the tree which was planted in honor of her father, Dr. James MacFarland. When Mrs. Frank L. Johnson, president of the Civic League, at the conclusion of an address in which she spoke of the beauty and the value of trees and of their fitness as memorials, came to the naming of the tree in honor of Dr. MacFarland, who died on the battlefield in France, his little daughter was lifted up and her hand placed on a branch beside that of Mrs. Johnson. All the schools in the city took part in the ceremony, which included the reading of a letter showing how the dead hero had won the Distinguished Service Cross for helping comrades under fire. As these men fought for a better America, so are they honored most in memorials which represent service, which stand for civic improvement and betterment and for the happiness, development and uplift of all classes. A fine example of the new community spirit which is being built up, of the finer Americanism which is being developed was displayed by the town of Reading, Massachusetts, on April 19, observed throughout the state as Patriots' Day, when everybody in the place turned out to help convert an eleven acre tract which had been donated to the city into a soldier's memorial park. Prosperous bankers and shopmen, men, women and children, worked together side by side with shovel and hoe, to make a place where the community might enjoy itself. Thirteen elms were planted in honor of the men from that town who had given their lives in the war, while several thousand other trees and shrubs were set out.



PLAN FOR MEMORIAL PARK

This is the way in which Fort Wayne, Indiana, has prepared to honor her soldiers. The large memorial grove in one corner of the park contains four and a half acres of oaks, each tree a memorial to a fallen soldier. Playgrounds, tennis courts, baseball diamonds and other means for community improvement are provided.

In this connection a most interesting group plan is being worked out by the Sharon County Church Community Center, Farmington, Iowa. There a two-day program with exercises devoted to the development of the park and playground have just been held and the special tree-planting day was designated as Roosevelt Day, because as Rev. Edward Roberts, pastor of the church, said in his communication to the American Forestry Association, "the present country life movement began with the report of the Commission on Country Life

appointed by Mr. Roosevelt; and this constitutes added reason for the participation of country churches in this memorial feature." Plans for the tree planting at Sharon working harmoniously with other community development schemes, were prepared by the landscape extension department of the Iowa State College. Such plans as those being put into operation at Sharon are powerful factors in encouraging the forward to the land movement. At Sharon there are directors of domestic science, recreation, children's play, athletics, gardening and all other social activities tending to better living conditions.

Anything that tends to city beautification makes for general social betterment. The work being done in setting out miles of trees through parks and of planning new parks, therefore, is most commendable. Minneapolis is placing several miles of trees through its extensive park system. From Spokane comes the report of the planting of a mile of maples along one of the finest residential avenues. Mrs. Sam Jones, president of the War Mothers of Atlanta, which organization was responsible for the conversion of Pershing Point into an attractive park, says in speaking of the project: "We feel that we are going to provide something of which Atlanta will be proud, both for patriotic and civic reasons. It will turn a place hitherto unattractive into a beautiful spot, thereby benefiting the city as well as honoring it."

In Philadelphia the trees to be planted in honor of that city's soldiers and sailors include a group of 500 in Logan Square, surrounded by the Cathedral and other historic buildings. This section of the city is being converted into one of the garden spots along the Parkway which extends all the way from City Hall, in the heart of the business district, out to spacious and beautiful Fairmount Park. Philadelphia is planting trees in many other places. Three oriental planes have been set out in Franklin Square in memory of the men from the fifth local draft board. Seventeen trees of the same variety were planted in Disston Park, Tacony, a suburb, in honor of the men from that community who lost their lives. Between the rows of trees a flower bed in the shape of a keystone has been placed and in the center of this a marble cross is to be erected.

Photograph by Dayton News

PAYING TRIBUTE TO OUR NATION'S HEROES

Pupils of the Harrison School, Dayton, Ohio, as part of their Arbor Day celebration, planted fifty-five trees in honor of former members of the school who were in army or navy service. They also honored in a similar way President Wilson, Generals Foch and Pershing, Governor Cox and General William Henry Harrison after whom their school was named.

"We cut the trees down ruthlessly, but the time will come when we will wish that we had more trees," declared J. L. Dumas, in addressing the Western Washington Horticultural Association at Everett, Washington, recently. He then went on to say that he knew of no

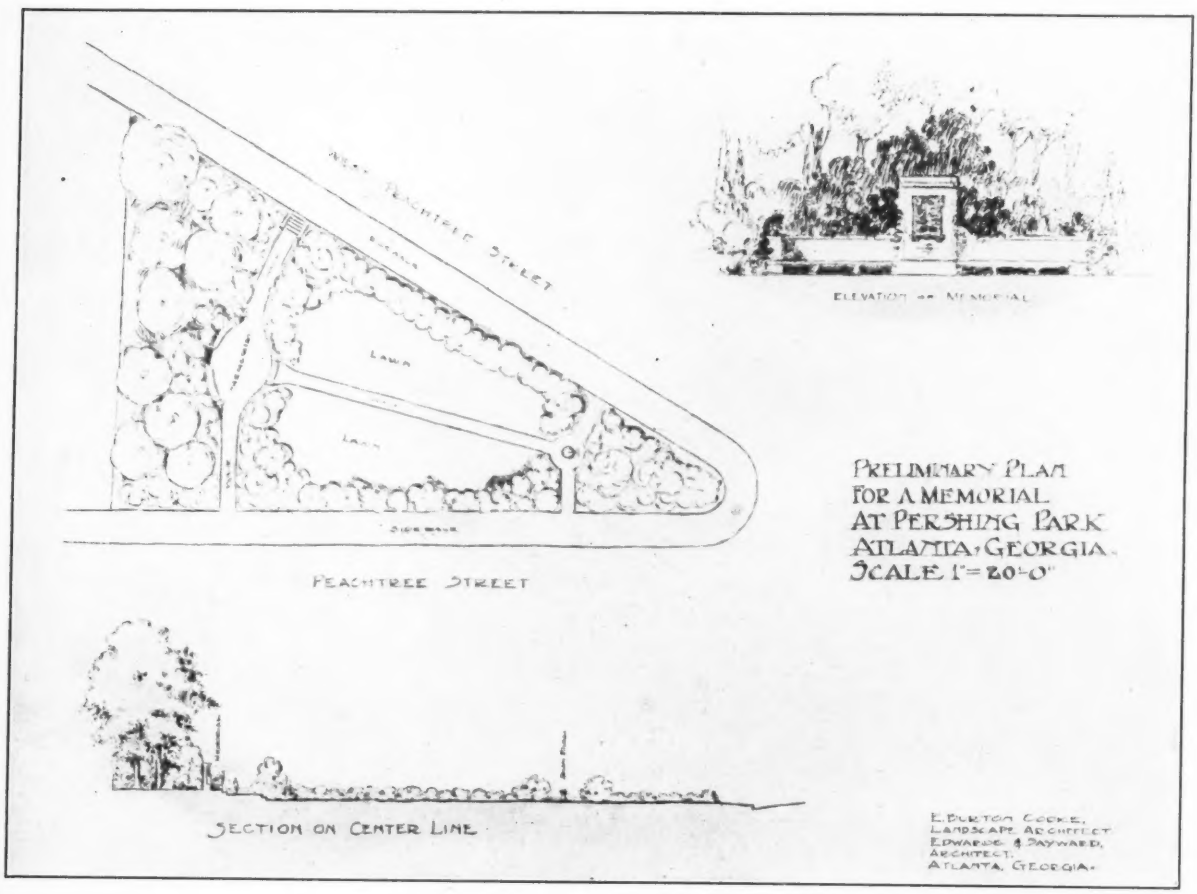
better movement than that of planting memorial trees to soldiers and sailors; and he added:

"I think that we should join in the great movement for planting trees along the roadsides." In Missouri one community has named a newly-constructed highway after its first son who gave his life in the service. Improvement of highways and tree planting go hand in hand and trees are being planted along highways in many parts of the country. Different species of trees are to be planted along the various roads in Michigan for which $50,000,000 has been voted, according to W. S. Linton, of the state tax commission and a member of the state good roads association. Along the highway from Chicago to Saginaw walnut trees are to be planted and this will be called the Victory Highway. The people along the route have promised, he reports, to improve and beautify their property. This is a good illustration of the way in which tree planting leads to other civic improvements.

A tree planting bill introduced by Senator Harvey A. Penney has passed the state legislature and been signed by Governor Sleeper which makes a special point of food producing trees. It provides among other things as follows:

"The Michigan Agricultural College and Public Domain Commission are hereby authorized to grow and acquire suitable seeds, scions or trees for planting under the provisions of this act, and to establish proper rules and regulations for distributing the same at nominal cost, or otherwise, to counties, townships, cities, villages, and citizens of the State for the aforesaid purposes, and also for State parks or other public places.

"It shall be unlawful to cut, destroy, injure, deface or break any ornamental, nut bearing, food producing or shade tree upon any public highway or place, except where such trees shall interfere with the proper construction or maintenance of such highways. It shall be unlawful to affix to any such tree any picture, announcement, play-bill, notice or advertisement, or to paint or mark such tree, except for the purpose of protecting it, or to negligently permit any animal to break down, injure or destroy any such tree within the limits of any public highway. Any person violating any of the provisions of this act shall be guilty of a misdemeanor and on conviction thereof shall be punished by a fine of not less than one dollar or more than twenty-five dollars, and in default of payment of any such fine may be imprisoned in the county jail for a period not exceeding thirty days. Such person shall be liable to the owner of the trees for treble the amount of damages sustained."



ANOTHER PLAN FOR MEMORIAL PLANTING

Here is an example of how cities are planning beauty spots to include both memorial and the planting of memorial trees. This suggestion by E. Burton Cooke is for "Pershing Park" in Atlanta, Georgia.

A resolution favoring the memorial tree plan of the American Forestry Association and urging the people "to plant nut-bearing trees wherever possible," has been adopted by the Paper Shell Pecan Growers' Association, of Illinois, J. M. Patterson, president, and Robert S. Carson, secretary.

In Fort Wayne, Indiana, a new park has been started in the east end of the city to be known as Memorial Park. It will be forty acres in size and will have a memorial grove of four and a half acres planted with oak trees, each tree in memory of a fallen soldier.

Rotary clubs throughout the United States have been leaders in many cities in adopting the memorial tree method of honoring their members. In Jacksonville, Florida, the club has given its approval to a plan for the purchase of a large city block which would be converted into a memorial park with an arch in the center and with groups of trees. S. H. Squire, president of the Elyria (Ohio) Rotary Club, reports the planting there of thirty-eight Norway maples in the grounds of the hospital in honor of the men from that town who gave their lives. Other civic organizations participated in the ceremony.

Don E. Mowry, general secretary of the Madison (Wisconsin) Association of Commerce, reports that the Girls' Civic League of the Association has planned to plant memorial trees in that city.

There are many places and much land not suited for agricultural or other purposes but which would make excellent land on which to start trees. The Michigan Agricultural College through its forestry department is planning more than 75,000 trees among the sand dunes in some of the Western Michigan districts in an effort to check the shifting of these big sand piles. It is estimated that the trees which the town of New Bedford, Massachusetts, has set out in the past few years will be worth at least $1,000,000 in twenty-five years. This commercial phase of the matter is worth any town's consideration. New Bedford claims to hold the record in New England for the number of trees in proportion to its street mileage.

In France they are going to convert historic Vimy Ridge which saw some of the bloodiest and fiercest fighting of the war into a vast memorial park to the Canadian soldiers. Pitted as it is with shell holes and craters made by mines it can never be turned again into agricultural land; and so the Canadian government will plant on it the maples of Canada. It has been suggested that in the same way the Argonne be made an American park, a shrine hallowed by the blood of American soldiers.

No meaningless memorials are those which are being erected today in city, town and hamlet to the sons of America who fought to preserve liberty and freedom. These memorials are taking on the form of community center groups of buildings, parks, playgrounds and recreation places. Thus combining utility with beauty, they will keep ever fresh the memory of the sacrifices made by the nation's heroes and serve both the present and the coming generations. In this united service tree planting takes a prominent part.

A NATIONAL FOREST POLICY--WHY AND HOW

THE solution of the forest problem in the United States depends largely on what is done with the private forests. Even with the most liberal sort of a policy looking to the protection of our public forests, including the acquisition of additional areas, it is upon the private forests that the future largely rests.

This is emphasized by a few striking facts which have recently been pointed out by Henry S. Graves, Forester, United States Forest Service. Colonel Graves has called attention to the fact that 97 per cent of the timber and other wood products used in the United States is obtained from privately-owned forests and that less than two per cent of the saw mills of the country are operating on public forests. Private owners hold four-fifths of the nation's standing; furthermore this is the best and most accessible timber. Almost the entire supply of certain important commercial species, such as white pine and spruce, southern pine, cypress, redwood and most of the hardwoods, is in the hands of private owners.

It is certain that few people realize the seriousness of the situation. There is need of an awakened public consciousness in order that remedies may be applied before it is too late for them to be of any avail. As Colonel Graves points out "we have hardly begun to stem the tide of forest destruction;" and there is need not only of a large program as far as the public forest lands are concerned but even more a radical change in regard to destructive cutting on private forest lands.

So rapidly is the available supply of timber being exhausted in some parts of the country, the South and the East particularly, that if the war had come fifteen years later "we would have had very great embarrassment in obtaining even the lumber needed for general construction," as Colonel Graves points out, "except at great sacrifice of time, cost and crowding of the railroads." Most of the lumber would have come from the Pacific Coast. Here are a few further facts in this connection which it is well to consider. Most of the original supplies of yellow pine in the South will be exhausted ten years from now, according to the manufacturers, and within the next five to seven years more than 3,000 manufacturing plants in that section will go out of existence. This means a moving of the lumber production center to the Pacific Coast.

What such a shift means, with the loss of competitive influence, can readily be surmised when it comes to prices and its effect upon the lumber industry and related trades and occupations. It is estimated that the Lake States whose supplies of timber only a few decades ago seemed almost inexhaustible, according to the narrow views which then prevailed and which still hold in some quarters, already are paying a freight bill of $6,000,000 a year to

bring in lumber and like products from outside sources. New England is cutting every year for lumber and other uses twice as much timber as is being grown there; and this affects a region which employs nearly 100,000 wage earners and has about $300,000,000 invested in the wood and forest industries.

What is true of New England is true of nearly every other part of the country. Wood is being cut without provision for proper replacement of the old stock. In cutting on private lands there is little regard for future supply, although some owners and groups are endeavoring to handle their lands constructively, but on the whole destructive processes are permitted which retard or actually prevent the succession of a good forest growth. The welfare of the country, its future economic progress and prosperity, demand that strict laws governing protection against fire and compelling proper cutting which will conserve a future supply, be made to apply to the private as well as to the public forest lands of the United States.

"There are certain things that the public should do, and in a liberal spirit," declared Colonel Graves, at Boston, "to make forestry by private timberland owners possible and effective. At the same time the public should insist by adequate legislation that the destructive processes be stopped, and that methods be adopted which will leave the forests in a productive condition. To secure these ends there is necessary a broad program that is practicable and equitable, based on consideration of existing economic conditions." In his Chicago speech the Chief Forester expressed the belief that along certain lines "the lumbermen are going as far as they can to improve the internal situation."

But there are certain big phases of the situation, he went on to argue, which call for co-operation between all interests concerned, between the national and the state governments, the lumbermen and the public and existing agencies, in order that the welfare of all may be conserved. For the question of forest renewal which is the backbone of the whole situation "is not only of interest to the public," he says, "but it is of vital concern to the owners of timberlands."

There is need for prompt action, Col. Graves makes clear. He declares that there is growing "public uneasiness" and that "public demand for action is increasingly insistent." Efforts of a local character, or which do not deal with the problem in a big national way, will not answer, he says. "Now is the time, therefore, to bring about action in accordance with broad constructive plans, rather than by piecemeal legislation by the different States, uncorrelated with each other, and with action of the Federal Government."

As to the action which he has taken looking toward the adoption of a national forest policy, the head of the Forest Service announces that he has initiated "a series of conferences with forest agencies of the states and with representatives of interested institutions and organizations." These conferences, he hopes, will form the basis in "laying the groundwork for a national policy."

Among some of the facts to which Col. Graves calls attention in connection with his discussion of the problem are the following:

1. The original supplies of yellow pine in the South will be exhausted in ten years; and within the next five or seven years more than 3,000 manufacturing plants will go out of existence.

2. Within the last 10 years new mill development for news-print manufacture in this country has almost wholly ceased, while in Canada during that time no less that 28 mills have been built, largely with American capital.

3. The Lake States, which a few years ago were the greatest producers of timber, are today paying a freight bill of about $6,000,000 a year to bring in lumber and other products from outside sources.

4. It is estimated that fully 30 per cent of all the lumber now used in New England comes from outside the region; and this is in addition to the importations of large quantities of pulp wood.

5. Many important wood-using industries are already embarrassed for supplies.

"The policies of the Government and the States during the next few years in matters relating to forests and lumber will be of far-reaching importance," says Col. Graves. "Conditions created by the war present certain problems of urgent interest to the lumber industry that will require definite action by the Federal Government." There are conditions, he asserts, "which both from the standpoint of the lumber industry and of the general public welfare demand constructive action."

In pointing to the urgent need of a national forest policy, the Chief Forester makes this statement: "The dissipation of our forests goes on with no let up, and still for the most part without any provision for the continuance of the forests after lumbering. Exhaustion of local forest supplies, the closing of industries dependent on them, the embarrassment for supplies of the pulp mills and other consumers using special classes of forest products, the generally mounting prices to consumers, are other factors which are calling sharp attention to the effect of forest destruction, and are causing increasing public uneasiness." He declares that lumbermen are giving thoughtful attention to the needs of the industry and they recognize that many things of a helpful and constructive character can be done within the industry in the way of cost accounting, economies in manufacture, scientific merchandising and so on.

"But neither the lumber industry nor the public can ignore the fact," he goes on, "that the great fundamental problems, which not only involve the permanence and stability of the interests dependent on our forests, but also gravely affect the national welfare, are not being solved."

These problems he divides into four general groups:

1. Those relating to the causes of over-production.

2. Those that concern the supply, character, well-being and stability of labor.

3. The problem of the continuance of private forests and of stumpage supply; and

4. Certain questions relating to the public forests.

As to the first of these—over-production—he says that "the elements which caused the unstable condition of the lumber industry prior to the war still remain, and constitute a danger for the future." Speculative character of timberland ownership, pressure to liquidate, difficulties of financing stumpage, excess mill capacity, the unorganized character of the industry, these were among the factors, he declares, that led to premature cutting and over-production, with its depression, losses, failures, interrupted operation, intermittent employment and other ills. "I do not see," says Col. Graves, "how there can be a permanent basis of conservatism, stability and individual strength so long as this condition exists."

"The public is concerned because of the injury and loss that accompanies demoralized industrial conditions, and because under such conditions there is increased waste in lumbering, protection from fire is less efficient, and the difficulties in the way of forest replacement are intensified. Failures that occur at such times often result in a transfer of lands, thereby increasing the tendency to centralization that may operate disadvantageously to the public in the long run."

Taking up then the labor problem, this is the summary of the opinion: "Temporary adjustments will doubtless be found, but a final solution will come, I believe, only with the placing of the lumber industry on a basis of stability and permanence."

Concerning waning timber supplies, the Chief Forester asserts: "We have been lulled into a feeling of security in recent years because we have an estimated total quantity of standing timber in excess of twenty-five hundred billion feet. The very situation to which I have referred of industrial instability due to the pressure of large quantities of stumpage for production adds to the impression that we have so much timber in reserve that we do not need to concern ourselves about supplies of forest materials."

"Not only the public, but many economists, have been misled by statistics showing the aggregate of timber still standing in the country. Forest depletion is injurious long before the last tree is cut and long before all but the last center of production is exhausted. When local resources are so depleted that industries close, the question of vanishing supplies takes on a new significance. And this is exactly what is happening in hundreds of communities. The forest supplies are used up; the chief industry, a sawmill, a box factory, or a wood-working establishment closes. Subsidiary industries dependent on the primary undertaking have to close also. And what is more, the land formerly producing the timber, if non-agricultural, is left in an unproductive condition and a burden for many years on the community."

Col. Graves referred to "many important wood-using industries." As "already embarrassed for supplies," especially acute being the situation faced by the manufacturers of news print paper in the northeast, in the Lake States and elsewhere, who had enormous investments in mills, water power and equipment.

But it is not so much the amount and character of timber now standing which concerns him as the production of new crops. "I would have little concern about the amount of timber used if we were growing new stands in place of the old. We have enough non-agricultural land to produce for all time timber in abundance for ourselves and for export. But this would require keeping our forests in a productive state after lumbering.

"We are not doing that," he continues. "Our forests are steadily deteriorating under cutting and fire. No effort is made for replacement after cutting. We are still drawing for the most part on original sources of supply. Failing to replace these, we are steadily losing ground.

"The question of forest renewal and growth is one that can no longer be ignored. It is not only of interest to the public but it is of vital concern to the owners of timberlands."

After expressing the opinion that "the transfer of great bodies of timber from public to private hands was a grave mistake of public policy," although "the action was taken and we can not undo it," Col. Graves asserts that the problems resulting from this policy cannot be ignored "and whether they like it or not the private owers have the problem of the right handling of a large part of our forests actually on their hands."

"On the other hand the public has a very essential interest in the question of keeping the lands in a producing condition so as to render a maximum of service, in supporting industries and local communities, and in serving to support through tax levies public enterprises of various kinds. Even though the public has surrendered its direct ownership of the timberlands, it cannot afford to permit them to be handled in a way injurious to the welfare of the community."

The existing public forests are not extensive enough or widely enough distributed to meet more than a part of the public needs, the Chief Forester points out; and so "we must continue to rely in considerable part on private lands, both for present supplies and for growing timber for the future."

This private ownership combined with a public responsibility which "has never been fully sensed or accepted," results in a "perplexing dilemma." "It appears to me that the situation is an impossible one that cannot long continue.

"As I see it," he declares, "either private owners must assume the full responsibility of properly caring for their timberlands, including protection and forest renewal; or the public must take over the responsibility that it once had and surrendered; or the public must share with the owners both the responsibility and the burden of securing the objectives that are essential to safeguard the public welfare. My own view is that the last is the only fair and practical method from the standpoint concerned."

In speaking of the public forests and their needs, the head of the Forest Service says that although they are being protected from fire, the timber being used as called

for by economic conditions and the cutting conducted so as to leave the land in favorable condition for the next timber crop, nevertheless there is need even from the standpoint of the handling of the public forests of a correlated public or national policy. This is true because "the manner in which the public timber is handled may vitally affect the lumber industry" and because "the problems of the lumber industry may affect the interest of the Government in the administration of its own forests." The question of cut-over non-agricultural lands and to what extent they should be taken over by the public, especially those on critical watersheds and on steep slopes, these and various other problems must be considered in connection with the forest situation as a whole.

"The problems which I have set forth," says Col. Graves, "touch many interests, both public and private. Their solution involves Federal and State legislation; and also involves co-operation between public agencies and the lumber industry. The different problems are closely interrelated with one another. Moreover, action in one section of the country concerns the interests of other regions. These circumstances make it clear that for a final solution there must be a far-reaching program that will enable the Federal Government, the States, communities and the industrial forces to unite in a common effort. Many efforts have been made to find a solution for some industrial features or some public features of the forest and lumber problems, and have failed because they have left out of account some outstanding question that must be solved at the same time."

Remedies hitherto proposed have had serious defects and have proved inadequate, in the opinion of Col. Graves; and he cites as an instance, the proposal made when the Clayton Act was under discussion that agreements be permitted which would allow curtailment of production when justified by industrial conditions. This and a similar proposal put forth in a referendum by the Chamber of Commerce of the United States, had two serious defects: "The vital object of the public to secure a continuance of the forests is wholly left out of account, and it would not, in my opinion, be really effective in bringing about a condition of permanent stability."

A second suggestion which he mentions, namely, that the public co-operate in the conservative financing of timber holdings through long-term loans at low rates of interest, is "only a half-way measure," in Col. Graves opinion, and "does not make any provision for the permanence of the forest." As to "tax reform" he declares that this would not accomplish the desired results. The various forms proposed "have made little headway, because for the most part they have not provided for meeting certain economic difficulties."

"In approaching the question of a national lumber and forest policy," says Col. Graves, "involving perhaps some radical departures from the present principles of relations between the public and industry, we shall find, I believe, that the most important and fundamental questions relate to the speculative character of forest ownership. Such ownership means cutting as fast as possible and without reference to how the land is left after lumbering. What is needed is some strengthening influence that would make possible the husbanding of the resource and its conservative use, as the public would use it if it had retained control over it and at the same time provide for the continued productiveness of the land.

"I am ready to advocate a policy more far-reaching in all respects than has generally been offered. I would afford whatever public assistance is needed to make possible the conservative handling of our forests, and I would then make fire protection, conservative production of lumber, and right methods of removal a matter of requirement, with such public direction and control as is necessary to realize the aims desired by the public."

The action required "may vary in different regions," according to Col. Graves. It may be a combination of several methods of public co-operation; in some localities the tariff or local taxation may play a large part in the situation; again the adjustment of international relations, the reform of taxes and other public measures must be considered; or where public and private lands are intermingled a plan that would co-ordinate all forest lands within economic groups—these are some of the factors which, it was said, would have to be considered.

"In all regions there is needed a broad policy of forest development, a policy which makes for permanent mills and all that means to the employment question, which places timber on the market only as it is needed, which protects the present resource—a difficult matter now even under the most earnest efforts to co-operate—and which classifies the land, encourages agriculture, puts to its best use every acre, and secures tree growth on non-agricultural lands."

The Chief Forester declared that he is in favor of "a greatly enlarged program of acquisition" of cut-over non-agricultural land, second-growth forest and protective forest which should be well distributed through all the forest regions and as they are acquired should be organized as municipal, state or national forests.

MINNESOTA will have a forestry appropriation of $85,000 this year, due to a change of heart toward the state forestry department in the closing hours of the State Legislature, which resulted in saving that department and the aforesaid appropriation of $85,000 a year. This is $35,000 a year more than was allowed two years ago. It is specified that not more than $10,000 be spent for reforestation, and not more than $12,000 for administration. The balance, $63,000 a year, is to be spent for forest fire prevention and protection.

THE tallest trees of the United States, says the *Canadian Forestry Journal,* are the California redwoods or the Douglas fir. Both claim the distinction of being the tallest, and it is an even match between them. A maximum of about 350 feet is the greatest, though a little more than that has been claimed. There is no question that in trunk diameter the redwood, that species known as sequoia, is the champion.

EXCLUDING ENEMY ALIENS WITH APPETITES DE LUXE

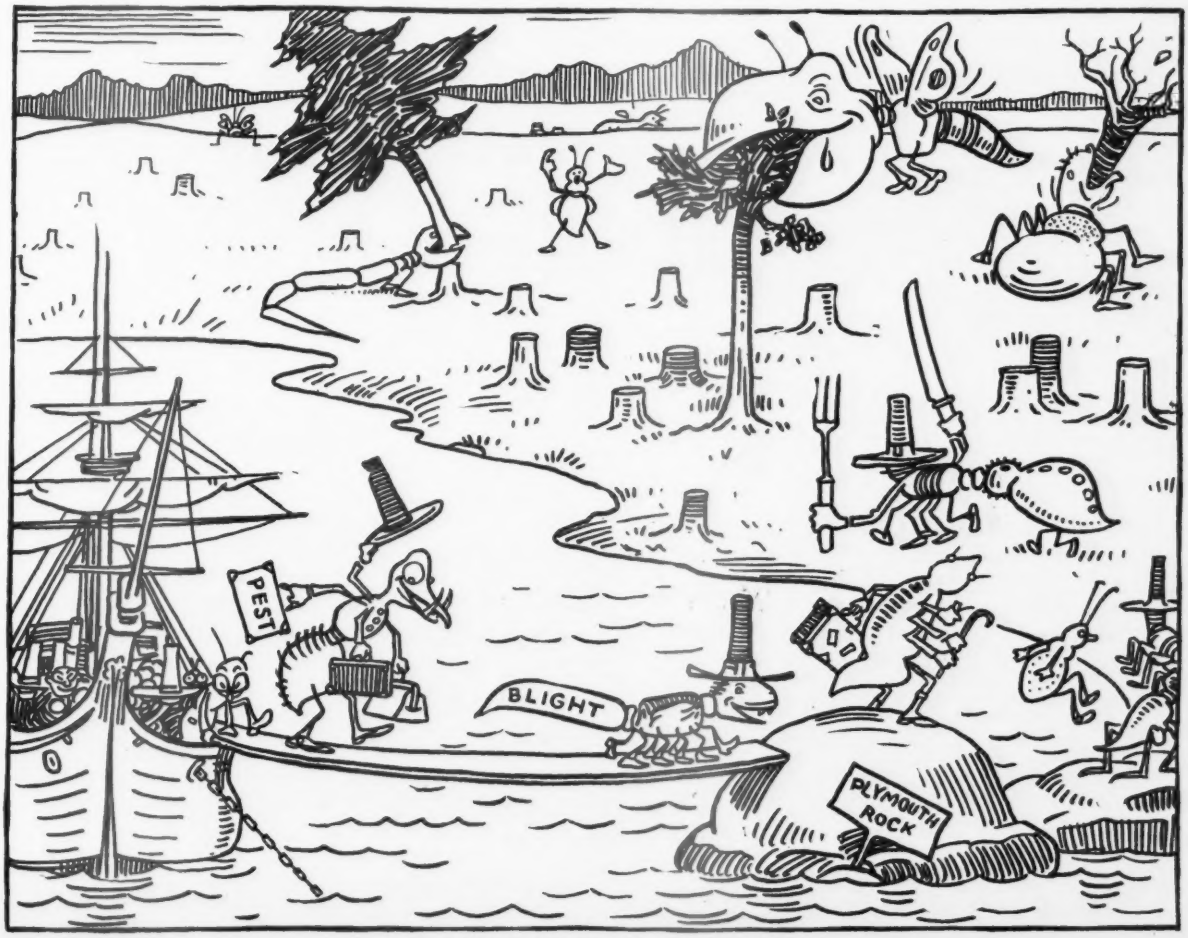
BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

A $500,000,000 banquet to alien enemies has been given annually by the American public. These aliens were not invited here, have performed no service, and yet have been fed on the fat of the land, adding to the high cost of living. They have tremendous appetites, consuming trees or entire forests, garden crops and fields of grain and cotton. These undesirable citizens that have made America their adopted home are insects and plant diseases which have been introduced from foreign countries. The recent quarantine issued by the Secretary of Agriculture, restricting the importation of nursery stock, assures us that the treasonable activities of these enemy aliens will be curbed in the future.

There's a pest for every plant. Adam must have been an aged man before he got married if he first took time to name all of the insects and fungi. It would require the life-time of an ordinary man even to pronounce the names which scientists have given to the known species and every day sees new discoveries added to these lists. The gardener and the fruit grower, the farmer and the forester spend a great deal of time and money in combating pests. Some plants have more than a thousand insects and fungus diseases which attack some portion of them, causing death or injury. However, most of the pests which attack our plants are native to America and have natural enemies which keep them in check. "And all those fleas have little fleas, upon their backs to bite 'em; and those again have lesser fleas, and so *ad infinitum*." Thus native insects have a host of voracious enemies, including birds, animals, and other insects, which preserve the "balance of Nature." The ravages of native pests seldom become devastating except occasionally in small areas and for a short time when conditions become exceedingly favorable for their rapid propagation.

Hitherto, America has maintained an open door to plant immigrants and, year after year, destructive insects and plant diseases have come to this country on these plants from abroad. Some of these pests have found the Land of Freedom entirely to their liking. Sometimes the climate here has been exceptionally favorable for their rapid development, at other times they have found new

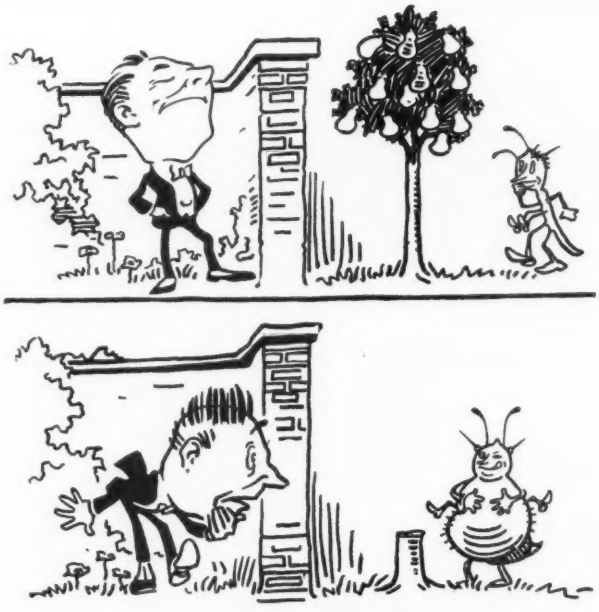


THE LANDING OF THE PILGRIM FATHERS

food plants. In such cases they have propagated rapidly because the balance of Nature was no longer maintained. They escaped from the enemies which held them in check in their own country, with the result in many cases that they increased so amazingly and wrought such tremendous damage that even the easy-going "pacifist" American public has been forced to fight them. In most cases, however, the fight against imported plant pests has been begun too late. We have waited until they became so thoroughly established over a wide area that it has been too expensive to apply eradication measures that would have been effective in the beginning.

Comparatively recent experience with imported pests has made it apparent that the bug is blightier than the sword. The uncontrolled ravages of the late blight and rot of potatoes in 1916 was responsible for the shortage in the potato crop which sent prices soaring and brought the humble spud into prominence hitherto unknown. Powdery scale and scurf are two other potato diseases which have been brought in from abroad. More recently, the potato wart disease, established in Pennsylvania from European importations, has given cause for alarm. The Hessian fly, introduced from Europe in Revolutionary times, causes an average annual loss to the wheat crop of fifty million dollars, and in some years the loss from this one insect has exceeded 100 million dollars. The loss of fruit due to the codling moth, together with the money spent in controlling this insect, costs the United States about 16 million dollars a year. Another imported fruit insect, the San Jose scale, entails a loss of at least 10 million dollars annually.

The tale of the gypsy moth, in ribald rhyme, illustrates



WHERE, OH WHERE IS MY LITTLE TREE GONE?

what happens when an insect reaches the United States from another country. To paraphrase:

There was a man who freed two moths,
And those two moths were mothers,
That year there were a million more,
The next a million others.

They had tremendous appetites,
And wrought great devastation,
Until the State with wrath arose,
And fought like Carrie Nation.

In this case an investigator was experimenting in Massachusetts with two gypsy moths imported in connection with an experiment in silk culture. Unfortunately the door of the cage was accidentally opened and the insects escaped. The investigator immediately notified the authorities of the danger but no attention was paid to the warning. A few years later the trees on a small area were defoliated but still no concern was manifested. However, the next year the insects became so numerous that a large territory was invaded by them and the authorities at last woke up. A fight was begun which has lasted for years and today it has cost more than 15 million dollars in cash for applying control measures, beside many times this amount of property damage.

"What next?" is constantly asked by the nurserymen, fruit

THE RAVAGES OF CHESTNUT BLIGHT

A forest of American chestnut trees destroyed by the chestnut bark disease, a pest introduced from China. This disease passes directly from one chestnut tree to another and no remedy has been found for it. The disease was first found in the vicinity of New York City, in 1904, since which time it has spread to Massachusetts, and southern New Hampshire, western New York, Ohio, West Virginia and North Carolina.

growers and farmers, when told of a newly imported and dangerous plant pest. It would seem as though the time had arrived when in order to grow a tree it is necessary for the one who wishes to harvest its fruits to stand guard over it day and night, armed with a spray can. Many a man has planted a tree and dreamed of the enjoyment he would derive from it as he rested under its benign shade, only to awaken some morning and cry "Where, Oh, where is my little tree gone?" Observe the classic example of the chestnut blight. This is a bark disease which was brought to this country from the Orient on Japanese chestnut nursery stock. It was first found on western Long Island in 1904 and two years later it had reached southward to Philadelphia. In ten years it spread over half of the

AT THE END OF THE STRUGGLE FOR LIFE

This once magnificent chestnut has now almost succumbed to the chestnut blight. It is difficult to estimate the enormous financial loss caused by this disease, but a hundred million dollars would seem to be a conservative figure.

United States and at the present time it has practically exterminated the chestnut trees within a 100-mile radius of New York and is rapidly accomplishing the complete ruin of our magnificent chestnut forests of the South. The loss caused by this single imported pest is many million dollars and its ultimate end will be the extinction of one of the most useful and most profitable American forest trees. Only recently it was found that a similar disease attacking the poplars had been imported from the nurseries of France and had spread over a wide area of the United States.

Other dangerous pests introduced from abroad are the Oriental peach moth, the Japanese beetle, the European earwig, the Leopard moth, the alfalfa weevil, the European eelworm, and the European corn borer. The latter is a pest which apparently was brought to the United States in a cargo of hemp unloaded at a rope factory near Boston, Massachusetts. It is exceedingly destructive to corn, feeding by boring in the stalk. In its operation it works upward, eating out a chamber from the

Photograph by courtesy Massachusetts Department of Agriculture

BEWARE OF THE EUROPEAN CORN BORER!

The European Corn Borer has made its appearance in Massachusetts, Connecticut and New York. The corn borer was probably brought into this country several years ago, possibly on hemp, and from its present distribution it would seem as though it was first established in or near Charleston, Massachusetts. It has spread rapidly and is now known to be present in not less than thirty towns in Massachusetts, mostly north and northwest of Boston.

This insect winters over as a caterpillar in corn stalks and some of the larger weeds. About the middle of May it pupates and emerges as a moth which lays a large number of eggs, sometimes as many as 700. The caterpillars from these eggs feed upon early corn and weeds and do considerable damage. About the last of July these caterpillars pupate and early in August another generation of moths appear. These lay their eggs (this time about 900) on corn and weeds (principally corn) and do a vast amount of damage, feeding on the stalks and ears of corn. It is this caterpillar or borer, that passes the winter in the corn stalks and large garden weeds, such as pigweed, ragweed, and barn-yard grass. The caterpillar which was present in the old corn stalks early in the spring has been responsible for 315,000 borers up to the first of October. As this insect passes the winter in corn stalks and weeds, very effective destructive measures are offered. Pull up and burn all corn stalks together with all old vines and all large weeds throughout and around the garden.

pith. The developing ears are also sometimes hollowed out. As high as 90 per cent of the stalks in a corn field may be infested. Over 200 borers have been found in the stalks growing in one hill of corn. Control is made more difficult by the fact that the borer feeds on a number of other plants, including the stalks of weeds and flowers, and may live over winter in grass roots.

Many people believe that we have been bringing in plants from abroad for so many years that now we have all of the pests to which plants are heir. This is a mistake, in the opinion of plant physicians who are best qualified to know. The Bureau of Entomology, United States Department of Agriculture, has published descriptions of over 3,000 distinct insect pests which are likely to be introduced into this country and cause serious loss. About half of these are European insects which feed upon forest and shade trees and the balance infest various cultivated crops. Among the important insects which it is hoped to exclude from the American continent are the Mediterranean fruit fly, considered by entomologists to take first prize as a destructive fruit pest, and the pink boll worm of cotton, from Mexico, which is capable of making the best efforts of the cotton boll weevil appear puny in comparison. The life stories of some of these pests, as unfolded by years of study on the part of patient scientists, are so amazing as to be classed with fairy stories by those who are little acquainted with the wonders of Nature. White pine blister rust is an instance. This parasitic fungus is native to the Old World, attacking the stone pine and other native five-leaved pines of Europe. When extensive interest in planting forest trees first began to develop about a score of years ago, white pines imported from Germany, France and Holland, brought this disease to the United States, principally in 1908 and 1909. Curiously, the safety of our white pines depends entirely on whether we can control the spread of the disease on currant and gooseberry bushes. The fungus cannot go directly from one pine tree to another but first must spend part of its life on currant or gooseberry leaves and in this stage it has the power of spreading rapidly and widely to other currant and gooseberry bushes. The fungus then develops another stage by which it is enabled to pass from the currant or gooseberry bushes back to the pines. If we destroy the currant and gooseberry bushes we prevent the disease from infecting our white pines. Hence, improbable as it appears to the uninitiated, the salvation of these magnificent trees depends to a large degree on whether people are willing to forego the luxury of currant jelly and gooseberry jam. Congress has passed a literacy test

Photograph by W. S. Carpenter, New York Conservation Commission

STRANGLED TO DEATH

A native ten year old white pine tree which has been girdled by the white pine blister rust, a fungus of foreign origin first found in America in 1906. The cankered area above the ax is due to the killing of the bark by the growth of the fungus. The disease has progressed to such an extent that the sap is being cut off from the top and the tree is in the last stages of destruction. This disease cannot be transmitted directly from pine to pine but must pass through an intermediate stage on currants or gooseberry bushes. To prevent white pines from becoming diseased, remove all currant and gooseberry bushes from the vicinity of the trees.

which will bar undesirable human immigrants, but there is no test which we can apply to exclude the army of injurious insects and plant diseases from abroad which enter as stowaways on nursery stock and other plant material.

The system of inspecting the importations of foreign nursery stock has proved ineffectual because the eyesight of the most competent inspector is not capable of discovering every insect or plant disease on every plant. Many of them, especially fungi, are hidden under the bark and are entirely invisible. It must be remembered that of many of these pests we have no conception, based on experience in its native land, as to its destructive powers under American conditions. Fumigation has been tried but it is manifestly impossible for any gas or liquid to penetrate to the interior tissues of a plant where fungus or borer may be hiding. The question "what shall we do about it?" has been answered correctly by the Federal embargo, which prohibits further importation of plants from abroad except such as are specifically sanctioned by the United States Department of Agriculture.

The United States is the last great nation to adopt measures to adequately guard against the dangers incident to the introduction of foreign nursery stock. We have thus wasted millions of dollars annually, and there remains the possibility of complete extermination of certain valuable economic plants. It is fitting that this action by the United States Department of Agriculture is taken now when we must conserve all of our National resources to help pay the huge expense of war.

There is always the possibility of bringing in pests in cargoes of merchandise, but the action taken by the Federal Horticultural Board, backed up as it undoubtedly will be by adequate supervision, is certain to prevent great losses in the future. An additional factor of safety is the recently organized American Plant Pest Committee, composed of State agricultural and forestry officials, entomologists, pathologists, and others interested in safeguarding the crops of farm and forest. The purpose of this Committee is to secure quick action for the suppression or control of dangerous pests as soon as they are discovered.

CANADA TO HELP FRANCE

BY ELLWOOD WILSON

G. C. PICHE, Chief Forester of Quebec, has just returned from some months' stay in France and says that the continent will require a great quantity of lumber, especially France and Belgium. Before the war, France was importing three million cubic meters, and Russia was supplying one third of this. The war has so depleted the French forests that they will require at least twenty years rest to be in position to furnish their normal yield. The demand will be much heavier than in the past owing to reconstruction needs and new industries, and will amount to about eight million cubic meters per annum. Canada and the United States will be able to supply a large part of this.

It would be advisable to help the French in their reforestation work. The Norwegian Society of Foresters is going to reforest at their own expense 250 hectares. It is suggested that Canadians should plant a tract on say, Vimy Ridge, with Canadian trees, maples perhaps.

The French Forest Service has suffered heavily during the war both by the loss of men and the lack of new men entering the schools. They are short one-third of their personnel which with the addition of the forests of Alsace-Lorraine, will accentuate their difficulties. They are considering a modification of their organization by giving more authority to inspectors.

The School of Forestry was reopened in December, 1917, in the building of the Institut Agronomique, in Paris, rue Claude Bernard. It has also suffered greatly by the war. Now that conditions are better the school is returning to Nancy. The French foresters are eager to return to the beloved forests of Alsace-Lorraine. The Serbs have an important group of young men at the school and it is expected that many more will come from Jougo-Slavia, Czecho-Slavia and Roumania.

A letter received from a prominent Norwegian forester says that there was no crop of Picea Excelsa last fall and that no seed is to be had. He also says that conditions in Russia are bad and that labor in Norway is somewhat infected by the virus of Bolshevism.

A letter from a Spanish forester says that conditions of unrest are disquieting and an anti-Bolshevist league has been formed.

LET TREES TELL THEIR GLORY, NOT OUR SORROW

WOULD not memorial groves—living, growing emblems of our sorrow and our pride—be more fitting monuments to our dead in the great war than anything made with hands? Would they not better carry their memorial message to this generation that mourns, and to unborn generations yet to be instructed and inspired? This is the sentiment expressed in *Country Life* in calling attention to the plans of the American Forestry Association both for memorial tree planting and registering such plantings in a national honor roll, as well as its work of helping reforest the devastated battle areas of our Allies abroad.

"What is it that clamors to be told—told now, and told for all time?" Miss Grace Tabor asks in writing on the subject in the magazine. "Not grief at loss, nor personal sorrow, nor even yet a national mourning. These things need comforting, not telling. Thus it is apparent that a very definite and possible thing is proposed in memorial trees—a thing quite as definite as any hitherto known form of monument or memorial even though it is not consummated by the blue print or the stone mason route. That it ties up with the great reforestation work of our own American Forestry Association in France makes it of deeper significance still. For these forests—millions of acres of them—will likewise inevitably be memorial groves to the American dead even though they were not planted to this end. France will make them so for France never forgets."

TREES AS WIRELESS TOWERS

THE tree is a piece of electrical apparatus. During the war trees in this country received wireless messages from the principal European stations for the information of the General Staff of the American Army. This most interesting and important fact is revealed by Major General George O. Squier, chief signal officer of the United States Army.

From ships at sea radio messages were communicated by way of trees to the various receiving stations in different parts of the United States.

Radio telephonic messages from airplanes were readily received by the tree-antennae arrangement. These messages were then transferred to the wires of Washington, D. C., and relayed to any desired point. Thus the linking up of the wire and the wireless methods of communication was found to be convenient and efficient.

General Squier pointed to the significance of the facts which he presented as an evidence of the value of "the physical method of studying all sciences," and he expressed the hope that the data in regard to trees as potential wireless plants would furnish "points of departure for further research."

THE TREE—SERVANT OF MAN.

"All through the ages there is shown in literature a feeling of reverence, sympathy and human intimacy with trees. It is significant that this practical thing possessing utility and natural strength, architectural beauty of design, and endurance far superior to artificial structures prepared by man, should be able yet further to minister to his needs."—Maj. Gen. George O. Squier, Chief Signal Officer, United States Army.

"The physicist and engineer, accustomed to deal with inanimate matter," he said, "is here confronted with the employment of living vegetable organisms of growing trees. From the moment an acorn is planted in fertile soil it becomes a 'detector' and a 'receiver' of electromagnetic waves; and the marvelous properties of this receiver, through agencies at present entirely hidden from us, are such as to vitalize the acorn and to produce in time the giant oak. In the power of multiplying plant cells it may, indeed, be called an incomparable 'amplifier.'

"For our present purpose, we may consider a growing tree, therefore, as a highly organized piece of living earth to be used in the same manner as we now use the earth as a universal conductor for telephony and telegraphy and other electrical purposes."

The Chief Signal Officer called attention to the fact that experiments which had been conducted before the war had shown the possibilities in this direction but that "with the sensitive amplifiers now in use it was possible to receive signals from the principal European stations by simply laying a small wire netting on the ground beneath the tree and connecting an insulated wire to a nail driven in the tree well within the outline of the tree top."

"It was soon found," said General Squier, "that a tree-antennae could be used efficiently as a multiple receiving set over widely different wave lengths, receiving either from separate terminals at the same or different heights of the tree or in series from the same terminal. This same type of circuit was employed in an inverse manner for telephonic transmitting purposes although the experiments thus far have been limited to short distances. Furthermore telephonic transmission through the tree-antennae was received by another tree-antennae and automatically returned to the sender on a wire system, thus making the complete circuit."

The value of trees in the study of many of the earth's physical problems was emphasized by General Squier, who quoted from an earlier report he had made on the subject, as follows:

"Our great forest areas may exercise an influence in maintaining a general equilibrium between the electrical charges of the upper atmosphere and the earth, which has not been fully realized. On this point comparisons between observations from the interior of great desert areas devoid of any vegetation, with those from other portions of the earth's surface well covered with forests, would be instructive.

"From this viewpoint the general surface of the earth may be considered as supplied by nature with innumerable meteorological observation towers, which possibly may be employed by means of apparatus involving principles already well known to science."

THE Massachusetts Forestry Association announces a most attractive itinerary for the 1919 trip of its members to the National Parks and National Forests. While the purpose of the tour is primarily educational, in making known to our people their great, public playgrounds, it also affords an essentially restful, invigorating and delightful way to spend an ideal vacation. The Association hospitably invites its members to make up parties and bring their friends and full information regarding the trip may be had by addressing Mr. Harris A. Reynolds, Secretary, at 4 Joy Street, Boston, Massachusetts.

WANTED—BACK ISSUES

We Need Copies of American Forestry for April, July and August 1918

HIGHWAY FORESTRY AND HORTICULTURE

BY HENRY W. HULBERT

SPEAKING of useful careers for returned enlisted men, handicapped it may be in one way or another for ordinary occupation, let me refer to one line which has been in my mind for a dozen years, and which seems to me altogether practicable. In every rural township in America the roadways take up a very considerable acreage, which, for the most part, is kept in a very unsightly condition and is left to be the breeding place of every bug and weed that can do damage to field and forest. Just so long as a highway is fairly passable during nine-tenths of the year the American public seems content. The advent of the automobile and truck is beginning to awaken general public interest in the road question and doubtless we shall see from now on a steady improvement in roadbeds, bridges and all other similar practical elements that concern transportation. The oversight of the engineering work involved in these improvements should open out to the returned men an increasingly large opportunity, especially as they have become more or less familiar with the wonderful road-systems of Europe.

But the line of activity I have in mind concerns not the roadbeds and the scientific drainage therewith connected, but with the strips of land on either side of these which ought to average on each hand at least twice the width of the roadbed. Here are many thousands of acres owned by the public and which are most often indifferently cared for, or not cared for, by the officials or the adjacent land owners. While a considerable portion of this land is so conditioned and suited that it cannot be made valuable for purposes of cultivation, it all can be a menace to the public in one way or another. Every square inch of it is susceptible of being esthetically improved if not of being made strikingly beautiful.

I can see the smile mantling the faces of perhaps the majority when they hear me say the roadsides of every township in America are capable, by proper care, of being made, in the end, rivals of any arboretum now in the country. What they might lack in variety would be made up in beauty and fruitfulness and practical interest; all placed directly before the eye of the passerby. Private ownership and constant economic need and opportunity are sure to lay low sooner or later every forest in the land thus privately controlled. On the highways and in the public parks, especially set aside, alone, may future generations have sure possession of mature specimens of most of our native trees, not to speak of foreign trees that may well be grown for their beauty or other interest.

WALNUTS AS STREET TREES

A highly desirable tree for street planting, under proper conditions of care and control. The walnut is a hardy and beautiful tree, reaching stately dimensions, and it bears a generous crop of valuable nuts.

Having taxed the patience of my readers thus far with an academic presentation, let me hasten to explain how all this can be financed and made practicable. Of course this cannot be done in a day. It will inevitably be the slow growth of years. But it is altogether feasible to begin at once. That beginning is, *to put a man on the job.* To do this will at once call for one of two conditions: (1) Either there must be a public-spirited township that

is ready to assume this added financial burden in good faith that in the end it will be a paying investment; or, (2) one or two or more public-spirited persons must underwrite a three or five years' cost of trying out this experiment. That in the end the permanent establishment of a township highway cultivation plan will be an asset that will pay for itself over and over again is the belief of the writer. Indeed, an efficient handling of the

THE SYMMETRICAL NORWAY SPRUCE

This ornamental species is particularly appropriate for park and road planting.

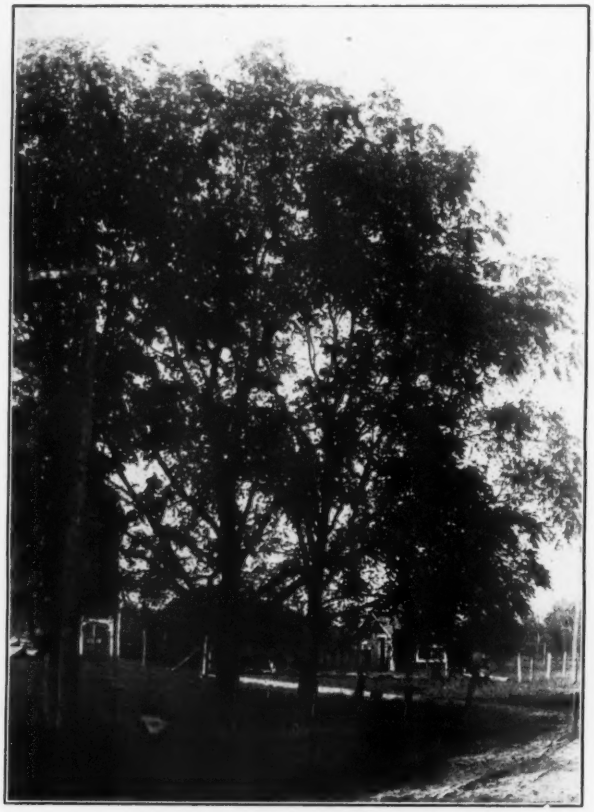
proposition will go largely toward paying regularly for the annual local layout on its roads.

In case there is an efficient County Improvement Society or a County Farm Bureau in operation, any township development along this line of roadside cultivation would naturally link itself up with the larger body. The man on the job locally would be working in harmony with a county-wide scheme of improvement. Indeed, it is possible in some instances that at first a county specialist would be put in charge of this work and, later, have township assistants taken on as the work would develop. But from the standpoint of the writer it would be better to have the man on the job a regular township official, working in harmony with any county scheme at hand.

This man on the job must be well prepared for his task. He should know his soil, his trees (botany in general), his entomology and his landscape gardening. He must be a timber, nut and fruit specialist, who can give satisfactory advice to the farmers. He should preferably be a good teacher of his specialty in all the schools of the township, utilizing thus some of the winter months. He might be the general director of school gardens also. A part of his salary might well find its place in the educational budget. Each year he might bring to the town distinguished specialists along several lines and hold, for a week, a convocation for general educational purposes. The school children would be present, take notes as a part of their regular school work, write essays, pass examinations on the addresses given, inspired by liberal prizes for excellence.

Under the supervision of the Highway Agricultural Superintendent, and in connection with the Superintendent of Roads, a careful study of the whole system of roads in the town would be made, keeping in mind the relations of the same to County and State roads. Some rarely used highways might wisely be closed, some new ones suggested and others straightened or otherwise improved, so that the generations to come would find that the science and art of our times were faithfully applied. It may be that a broad-minded scheme might be adopted by the township for a generous widening of the roadside areas, especially where ancient plans seem to be too cramped. Cordial co-operation on the part of the landowners would help immensely to accomplish the end sought.

But long before all this could be accomplished, and even if none of it could be undertaken at once, the High-



WALNUTS FOR SHADE

These comfort-giving trees are planted along a roadside in Michigan.

way Superintendent could get at work. Undesirable trees and shrubs along all the township highways should be cut down and sold for lumber or firewood, or be burned, especially where destructive insects are at work. All good trees should be properly trimmed and doctored, so as to give good chance for growth. Three kinds of

trees should be set out, wherever available places can be found.

(1) Purely ornamental trees would be the first thought of as in harmony with all former ideals. Already much has been done at this by our forefathers as they obeyed the injunction,

"Woodman! spare that tree!"

or have set out stately rows of elms, ashes, maples, locusts, poplars, horsechestnuts or evergreens of various species. Local encouragement might easily increase this sort of planting and wise suggestions might improve roadways from an artistic standpoint. But the planting of ornamental trees would be fostered continuously by the Highway Superintendent, with variety as well as quality always kept in mind. Sometime trees will be planted for their form and elegance, like the American elm as distinguished from the "swamp elm" or even the English variety. Again mass of foliage and density will call for the horsechestnut and the maple. Some will be set out for their flowers. The famous cherry tree of Japan is cultivated not for its fruit, but the season of its blossoming is made a public holiday.

A BEAUTIFUL AVENUE OF TREES LINING A ROADWAY

These magnificent trees are California black walnuts, and the planting is at Rancho Chico, California.

(2) A second most important type of tree to be cultivated on the roadside is the nut variety. Here much will depend on climate and soil. No inferior nut tree should be allowed to grow along the roadside, except for ornamental purposes or for value of timber. High grade hickory trees would prosper in certain districts and could be planted along the roadsides by the tens of thousands. High grade hazel nuts, black walnuts, butternuts, chestnuts (where the blight has passed entirely by) as well as hardy exotics like the English walnut and the pecan. I put in a plea for the much neglected beechnut, provided the quality can be of the best. The tree itself is highly ornamental and should be set out by the thousands in localities adapted to it. In Europe long lanes of beech trees are famous. The Highway Superintendent would be on the watch for new and highly flavored and hardy nuts, and be quick to secure all improved and adaptable species. He should not be afraid of experimenting with unknown quantities, on occasion. Nut gathering week should be a public holiday season. Up to that time the school children have been the special guardians of the nut trees and on the week designated should help gather the public crop on shares. Nut trees that turn out inferior fruit should be grown and cut for timber.

A HANDSOME CHESTNUT, FULL OF FRUIT

The chestnut bears a heavy crop of nuts each year and is, as well, a tree of beautiful contour. Unfortunately, its general planting cannot be advocated, because of the blight which is slowly but surely destroying the species. It is only safe to plant it in certain localities and then it must be watched most carefully.

(3) But the main attention of the specialist might well be turned toward fruit culture, which would be the principal subject of his teaching in the schools. At once, on coming to his job, he will trim up and graft all strong apple trees along the

roadsides, putting in the finest quality of graft. He will dig up the soil at the roots and put on roadscrapings or any other available fertilizer. Then would come the setting out of marketable kinds of apples of high grade wherever the soil and situation warrant it. Many a township could absorb ten thousand Baldwin apple trees with a good grade of peach in between, to be thinned out as the apples grow. Other varieties of apple, as well as pear, cherry, plum, quince, and, to a limited extent, grapes could be added, especially those for canning purposes. Fruit trees can be raised along the highways to the limit of the powers of cultivation and spraying and marketing. When once farmers can see the advantage to them they would be ready to cultivate on shares the trees along their farms in the roadside. By a plan of careful selection, marketing only apples of superb quality a town might get a national reputation for its fruit and command a superior price. All but the best of its fruit could be used at home in a dozen ways almost as valuable from the monetary standpoint. The question of small fruits, such as high grade raspberries and blackberries and blueberries might be taken up and many otherwise barren spots be made beautiful and fruitful as well.

The writer is assured in his own mind that here is a practicable way of adding to a perceptible degree to the wealth of the world, saving waste at least, and furnishing a valuable life work for thousands of intelligent men and women. Indeed women might assume the direction of many phases of this work as well as men. Community leaders along this line would have an enviable opportunity. The educational side of the undertaking is most important and would help bring forward a generation full of big ideas. The plan adapts itself to many new phases of activity, such as the Boy and Girl Scouts, the County Y. M. C. A. development. Let one township do the thing effectively and others are bound to follow so healthful and fruitful an example. The specialization involved in the plan would bring a unity to the rural life of the community and develop many unexpected values to the town.

A SIMPLE WAY TO DESTROY CATERPILLARS

BY EDWARD P. SPERRY

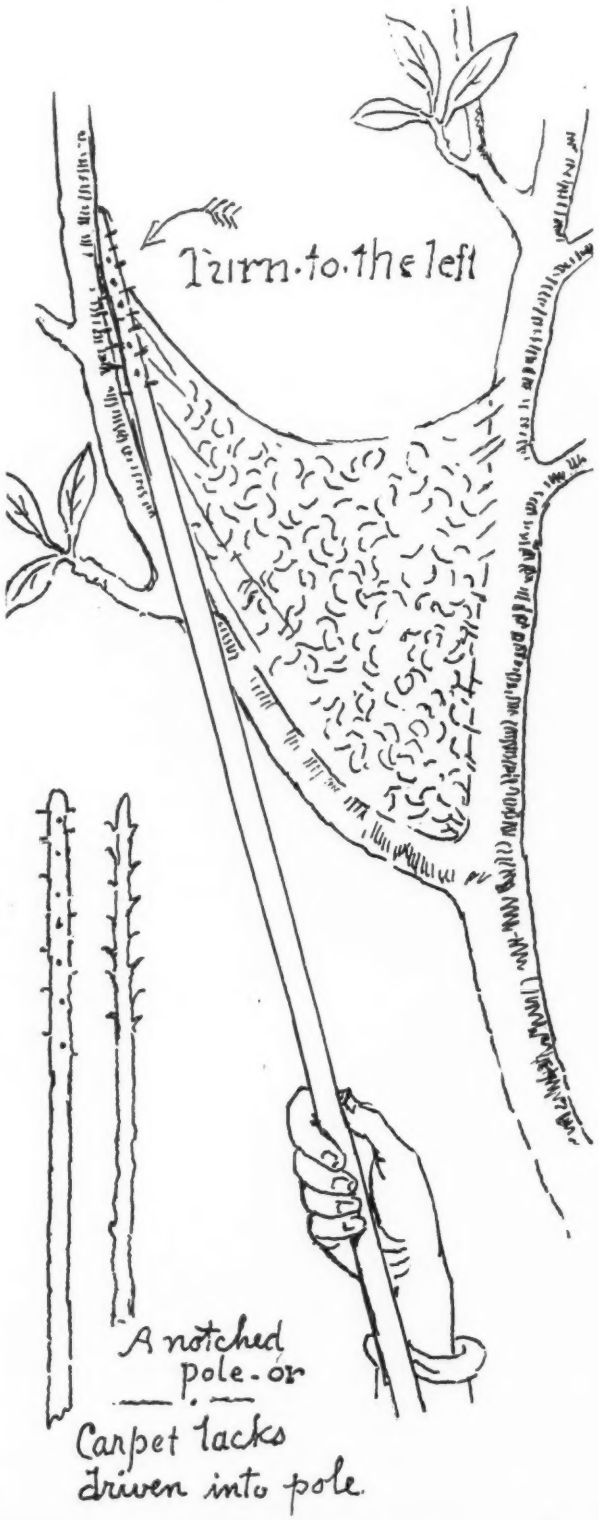
CATCH the web at its highest point. Turn your stick slowly allowing it to rest gently against the branch.

Keep turning your stick down to the crotch, then ascend the other branch to the limit of the web.

The entire web with every caterpillar imprisoned in the web, is on the end of your stick to be plunged into any liquid that will kill them.

Burning out nests frequently harms the bark.

By the method described, one can destroy three or four webs in the time it takes to burn one besides the trouble to renew rags is obviated.



THIS IS THE DEVICE

A rake handle, with carpet tacks driven in to protrude about a quarter of an inch, or, a natural stick notched by a pocket knife, as shown in the cuts.

PROTECTING BIRDS AS AN ACT OF PATRIOTISM

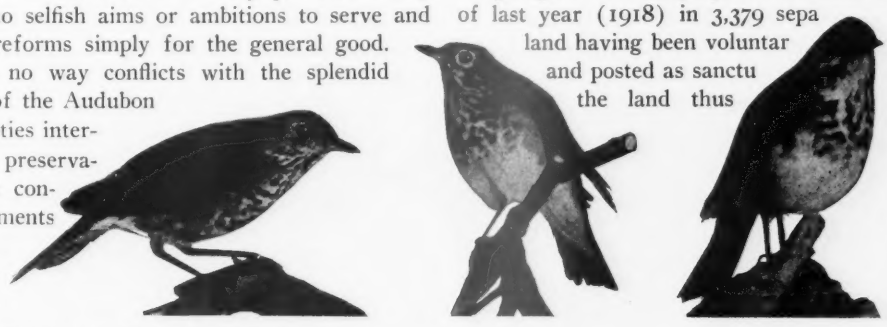
BY MOODY B. GATES

"The birds—that make sweet music for us all
In our dark hours—as David did for Saul."

IN THE general endeavor to win the war attention has not been centered so much on particular ways and means as on general results. Nevertheless many things have been done which will loom up large in the perspective and which it will take the restored normality of peace times to value at their full worth.

Prominent among these is the remarkable stride made within the past year in the direction of establishing bird sanctuaries throughout the nation. This development demands recognition, marking as it does a very forward step in a much needed direction and showing results which indicate that a firm foundation has been laid on which to build along similar lines.

Above other things, it indicates that under sufficient impetus our people are always ready to take up and push forward any humanitarian or conservation project of which the benefit is clearly pointed out by those having no selfish aims or ambitions to serve and who take up reforms simply for the general good. This work in no way conflicts with the splendid achievements of the Audubon and other societies interested in bird preservation. On the contrary it supplements and makes effective the educational work which the other organizations have done and are doing. In the case of the remarkable record herein described it is apparent that wonderful results are to be obtained by simple, direct, educative appeal. This showing of one million acres of land voluntarily pledged for bird sanctuaries and distributed throughout the entire country and over the boundary line in Canada is a tribute to the power of editorial influence, not only in bringing about tangible results, but in paving the way to giving legislation its maximum effect. In the space of only a few months, more concrete results in establishing private bird sanctuaries have been attained, than ever before in a like period of time. One can readily imagine the results if all national publications were to join hands in this or in a similar constructive work for Wild Life Conservation, Forestry, or anything else of public benefit.



Photograph by Brown Brothers

THREE VARIETIES OF THRUSHES

None but thoughtless youngsters would shoot beautiful warblers like these or desecrate their homes, yet thousands of nests are robbed every year.

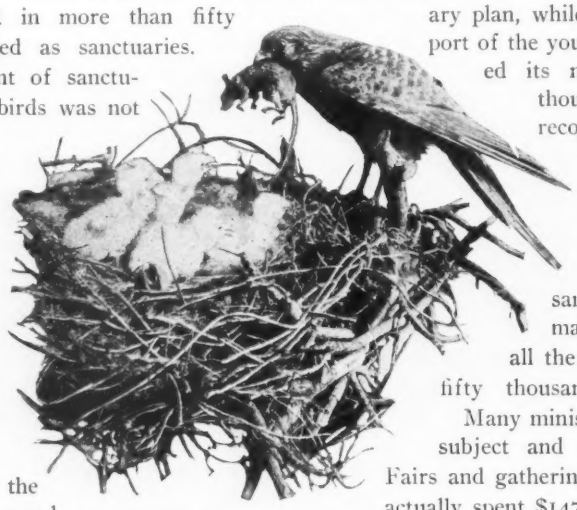
When the United States entered the war and the question of food for our soldiers and those of our Allies became of paramount importance, *The People's Home Journal* began a campaign of education among its readers; first, to teach the value of birds as protectors of growing crops, and, second, to put this knowledge to practical war work account by appealing to patriotic impulse. The necessity was pointed out of saving the birds from wanton attacks and encouraging their increase by affording them protection from hunters and guarding them as much as possible from their natural enemies as well as from extremes of weather. Volunteers were called for, to pledge their land holdings as safe nesting places and to furnish a supply of food for winter birds which perish in multitudes in time of severe sleet and ice storms.

To make the effort systematic and effective, the establishment in every district of a great number of bird sanctuaries was urged. Owners of farms and wooded tracts were asked to sign pledges that they would forbid hunting on their property and would conspicuously display the sanctuary notices furnished to every signer of the pledge. This campaign has resulted, up to October 1 of last year (1918) in 3,379 separate tracts of land having been voluntarily set aside and posted as sanctuaries for birds, the land thus dedicated comprising a total of 933,975 acres scattered through forty-two states and Canada. The signing of pledges still continues and the total acreage is steadily growing. The appeal to adults was further supplemented through "The Green Meadow Club," a department edited by Thornton Burgess to interest younger readers in nature study and the protection of wild birds and animals. A special appeal was made to the members of the club, through this department, to devote their energies through the summer to obtaining pledges for bird sanctuaries. Juvenile readers were shown that in furthering this important work they were performing a war service no less than were their older brothers in France.

That the youngsters took up the work in this spirit was shown by hundreds of enthusiastic letters. A Wisconsin boy wrote that he had taken the place in the field of an older brother who was in khaki, and in addition was devoting all his leisure hours to urging neighboring farmers to sign sanctuary pledges. A school girl from the same State who lived in a thinly settled district, walked and rode many miles daily, visiting distant farms, till she had secured pledges for an even hundred tracts and

tacked up the sanctuary signs. This record was even exceeded by another girl on a Montana homestead who, after covering her own district on horseback, persuaded her father to take her in the motor to far distant sections. Her efforts resulted in more than fifty thousand acres being pledged as sanctuaries.

In urging the establishment of sanctuaries, the aesthetic value of birds was not ignored nor the pleasure to be derived from the beauty of their plumage and the charm of their song; but the big emphasis was placed on the practical and patriotic argument that the protection of birds was part of the universal effort to win the war, and that the protection of birds meant bigger and better crops and more food.



Photograph by Henry Hill

THE SPARROW HAWK

One of the most useful of birds. It destroys large quantities of field mice as well as a great variety of the larger insect pests but is a showing mark for the man with a gun.

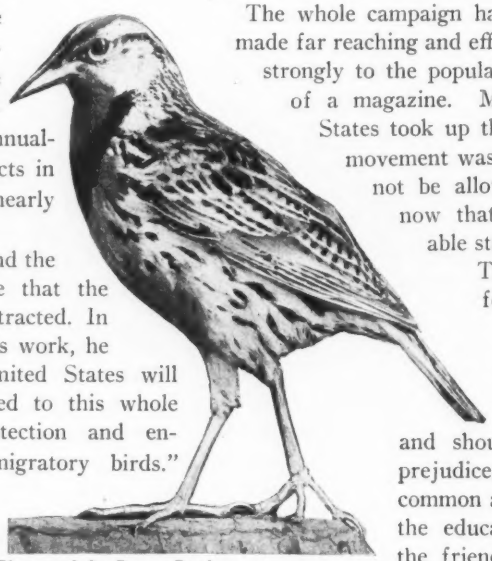
It was shown that but for the efforts of birds, insects and weeds would in time make the profitable growing of garden crops an impossibility. Figures compiled by government investigators were quoted to show the enormous numbers of weed seeds and insects eaten by the quail, robin, bluebird, flicker, nighthawk, meadowlark, and all the more common birds of the American fields and woods. The fact was emphasized that such birds as owls, hawks and crows, which ordinarily have an evil reputation, largely because they are songless and plain of plumage, are indispensible as destroyers of field mice and other pests that destroy and damage millions of dollars worth of food annually, the total destruction of farm products in a single year having been estimated at nearly a billion dollars.

The results achieved from the start and the enthusiastic response were so notable that the attention of Mr. Herbert Hoover was attracted. In a letter to *The Journal,* commending its work, he said: "I hope the people of the United States will be made to realize how closely related to this whole question of food-saving is the protection and encouragement of insectivorous and migratory birds."

Dr. William T. Hornaday, head of the New York Zoological Park and managing director of the Permanent Wild Life Protection Fund, an organization for the protection of the nation's wild life, thought so highly of this sanctuary movement that he caused the fund to offer its exceptional gold medal as an added incentive for the workers. At the end of the 1918 campaign, Dr. Hornaday was so greatly impressed by the marvelous results achieved that he recommended that the Permanent Wild Life Protection Fund award four gold medals instead of one, thus signalizing the importance of the results achieved. The encouraging aspect of the situation in its broader outlook is that the sanctuary plan, while it won the enthusiastic support of the youngsters from the start, received its most effective support from thoughtful men and women who recognized it as an opportunity to establish bird conservation as a permanent popular movement of which future generations could feel proud. Among the thousands of sanctuaries obtained, there were many of one acre, and they ran all the way from that up to one of fifty thousand acres in New Mexico.

Many ministers preached sermons on the subject and delivered speeches at State Fairs and gatherings of farmers. One minister actually spent $147 of his own money to secure pledges and succeeded in signing up 65,268 acres in seven counties in West Virginia. Another minister in Pennsylvania signed up 72,932 acres as a result of his personal enthusiasm. Each of these clergymen was awarded a gold medal by the Permanent Wild Life Protection Fund. In the heart of a big game country, Saskatchawan, Canada, a game guardian was inspired to take up the sanctuary work and succeeded in securing 37,745 acres posted for bird protection under no small difficulties.

The whole campaign has shown that the work was made far reaching and effective as a result of appealing strongly to the popular mind through the columns of a magazine. Many schools in the various States took up the work and in this way the movement was given an impetus which will not be allowed to die through neglect, now that it has had such a favorable start.



Photograph by Brown Brothers

THE MEADOWLARK

It devours vast quantities of the white grubs which attack the roots of growing crops. Forty-seven cotton ball weevils were found in the stomach of one lark.

The sanctuary workers often found their task far from easy. First there was to be overcome the well established belief among farmers that birds destroy crops and should be exterminated. This prejudice, while not at present so common as a few years ago, thanks to the educational work carried on by the friends of birds, is still strongly enough entrenched to cause much resistance. An even greater handicap was the objection of hunters to giving up their sport. Many property owners were ready enough to bar other hunters from their property but wanted to reserve the right to hunt on their own preserves. Any property owner who insisted on this right was not accepted as a sanctuary signer.

In view of the world shortage of food, this bird sanctuary campaign will be urged more strongly than ever the coming summer. Already the subject of bird sanctuaries is no longer new in millions of homes and the way has been well paved for further propaganda along this or other educative lines for the conservation of wild life in its various forms. The bird sanctuary movement will be kept up and carried on with zeal and enthusiasm until the whole country is thoroughly converted to the necessity of bird protection.

The whole campaign has been conducted along broad lines. The right of the sportsman to enjoy his favorite recreation wherever game is sufficiently plentiful to allow of pursuit, governed by the ethics of true sportsmanship, is fully recognized. There has been no desire to antagonize the true sportsmen, but rather an effort has been made to enlist their co-operation. Thus when a land owner has refused to make his property a sanctuary unless shooting thereon was to be permitted during the open season, that land owner's attitude has been respected and effort has been concentrated on others in that vicinity who have no such objections.

The whole theory underlying the campaign is the need of individual farms or areas of land adapted to bird life, scattered through every district, made into sanctuaries as breeding grounds for game as well as for the strictly insectivorous birds. It has been pointed out to sportsmen that such sanctuaries will, in years to come, mean more and better sport. The overflow from these sanctuaries is bound to stock the remainder of the country.

Photograph by Brown Brothers

THE CATBIRD

Ants, bettles, caterpillars and grasshoppers constitute three-fourths of its food. Its vegetable diet is obtained from the berries of wild vines. Poison ivy and sumach are a part of its diet.

Photograph by Brown Brothers

THE CUCKOO

Much given to eating the large hairy caterpillars which live in colonies and are most destructive to leaves of trees and plants.

While there have been some very large sanctuaries established, notably one of 50,000 acres, stress has been laid on the value of the small sanctuary of only a few acres and the advantage of securing as many of these as possible. A large number of small sanctuaries is of greater value than one or two very large sanctuaries because of the greater number of people immediately interested. Ten sanctuaries of five acres each means the immediate personal interest in the movement of ten families, against the interest of only one family in the case of a single sanctuary of fifty acres; thus an effort has been and is being made not only to secure as large an acreage as possible but to interest in the work as great a number of people as possible.

Taking it altogether the lesson to be learned from this preliminary crusade for nation-wide bird sanctuaries is that the people of our country can be depended on to respond liberally and enthusiastically to any practical conservation movement or constructive reform affecting the general good when the object is made sufficiently clear to them. Continued educational work such as has been done in this instance should be taken up by our national magazines and extended so that other national interests, which need only intelligent direction, may be crystallized into permanent constructive action.

MAJOR D. T. MASON, recently returned from military service abroad, is doing special work in the Treasury Department, at Washington. The Bureau of Internal Revenue, finding difficulty in administering the Income and Excess Profits Tax law with regard to the so-called "Wasting Industries," has turned to men familiar with forest industries, as many of operations involved include mining, gas, oil and those dependent upon the forests for their raw material, and Major Mason, with the title of "Forest Valuation Expert," has been placed in charge of the organization of this work.

WALKS IN THE WOODS

(III) WITH WASHINGTON IRVING ALONG THE CROTON AQUEDUCT

BY J. OTIS SWIFT, AUTHOR OF "WOODLAND MAGIC"

(PHOTOGRAPHS BY THE AUTHOR)

THE warming sun entices us forth this spring morning for a walk along the top of the Old Croton Aqueduct from Hastings-on-Hudson to Tarrytown. The Aqueduct was built many years ago to supply New York City with drinking water. It has long since become an integral part of the landscape. It skirts the eastern bank of the Hudson for many miles, paralleling Broadway, the ancient post road that stretches from the Battery in the city to the Capital at Albany.

LOOKING UP THE AQUEDUCT NEAR THE GOULD ESTATE

It meanders through the most historic region near the metropolis, and for eight miles through what are perhaps the richest private estates in America. It is a level stretch of grassy banks bordered most of the way with giant old forest trees. It is the easy path of communication between sleepy villages of the Hudson Valley; the Lovers' Lane where Darby and Joan saunter hand in hand on summer evenings, with none to see save the sympathetic moon. It winds through a country made famous by Henry Hudson, Washington Irving, George Washington, Rochambeau, and incidentally by Major Andre, the British spy. Though from picturesque turns of the path one may look, these spring evenings, straight down the river past the Palisades, and see the myriad twinkling lights of Manhattan, it is for the most part a secluded country lane, fenced, and dashed here and there with weirdly fantastic and lovely scenery.

We go down through the garden here at the Manor in Hastings, past the big white oak guarding the upper end of the little ravine where the Americans lay in ambush to surprise the Hessians at the Battle of Edgar's Lane, in the Revolution. We come out on the Aqueduct at "Locustwood," the old Minturn estate, now the home of Major Frederick G. Zinsser, where tradition says that Louis Napoleon was once a guest and where Admiral Farragut, who lived on the other side of the village at a later date, was often a visitor.

The fine colonial mansion, back from Broadway, is bowered among mammoth horsechestnuts that are glorious in blossom; white pines that may have soughed above the heads of Colonial troopers; two beautiful old English lindens brought over and planted here by the early Minturns; one of the most imposing copper beeches in all the Washington Irving country; locusts from which the old place gets its name, and many other interesting trees.

WASHINGTON'S HEADQUARTERS, AT DOBBS FERRY, WHERE HE PLANNED THE YORKTOWN CAMPAIGN

A sanctuary of trees, shrubs, and wild birds, are the private estates along the Hudson. The patient hands that planted these whispering giants are dust, but the blessings bestowed by them go on from generation to

TULIPS AND SYCAMORES BESIDE THE AQUEDUCT

generation. Just before we reach Dobbs Ferry where Richard Harding Davis' hero "Captain Macklin" lived, and where is the tree-embowered home of the late Robert Ingersoll, we come upon one of the many "Washington's Headquarters" in this locality. This beautiful old manse here in the edge of Dobbs Ferry attracts us at once because of the fine spreading English walnuts, monarch horsechestnuts and big elms shading the lawn and flower garden. Comfortably dozing away the years it sits beside Broadway brooding over the Tappan Zee glistening in the spring sunshine to the west. Mr. Messmore Kendall in recent years purchased this one-time home of Peter Van Brugh Livingstone, of a famous colonial family, and restored it as a patriotic duty and as a home for himself. Here Washington planned the Yorktown campaign. Some of the walnut trees were planted, it is said, by Washington while he used this house as headquarters. One of the walnuts is directly in front of the house, shading Broadway; one at the south entrance to the grounds, and two back of the house near the Aqueduct and the little buildings that were the slave quarters. There are Norway spruces, black cherry, oak,—and an ancient wisteria clambers over the porches about the doors and windows, with their beautifully hand-forged iron hinges and fixtures. One wonders at the craftsmanship of the blacksmiths and locksmiths who forged the doorlatches and locks of these old homes. What has become of the craft? Rest assured that the character hammered out on their anvils has come down the centuries making safe the government they helped to establish. Just beyond Dobbs Ferry where stood the Indian village of Weckquaskeck at the mouth of the rivulet called Wyaquaqua, the Aqueduct embankment, winding regardless of village topography, crosses a deep ravine wherein is a happy little brook laughing down from the ridge of hills to the east, tinkling its way through the park of the country home of Edwin Gould. The big house sits on the bank above the river to the west of the Aqueduct, and its winding drive from Broadway follows the north edge of the dell. The ravine itself is a bit of natural woodland in the heart of extensive parkage. It is locally historic, for from the point where the brook slips into the shining Hudson not far from where the shell heaps of the aboriginal village of Weckquaskeck, up through the heavily forested gully, used to wind the trail of the Mohican Indians who passed this way from their canoe landing on their return from the summer hunting grounds up-State to their winter village in the Nepperhan Valley.

"LOCUSTWOOD," AT HASTINGS-ON-HUDSON

As we look down into the ravine through the tops of giant old tulips and white, ivory sycamores, we can picture the dusky tribesmen pausing beside a great bowlder dropped from the bottom of some grinding glacier. We see the shadowy warriors lounging about, smoking their long pipes while the black-eyed, red-bronze cheeked squaws made a fire with sticks and expose to the heat such trout and salmon as these enthralled brooks have not known for nearly three centuries.

There is a picturesque mystery about these bits of forest hidden among millionaire estates on the Hudson, that reminds us of the legends of Sleepy Hollow, and those older and more intimate tales told by imaginative

A BOULDER DROPPED FROM THE BOTTOM OF SOME GLACIER, IN RAVINE ON EDWIN GOULD'S ESTATE

nurse maids, of queer Little People,—fays, naiads, wood-gnomes, who come out of their fern-hidden grottoes on moonlighted nights to play pranks with the sleepy gardeners and ride the backs of flying squirrels among the shadow-haunted, limb-crossed sky spaces in the tree tops. It is hard to believe that all this lovely wilderness of brake, azalea, wild roses, ferns, mossy banks and hidden dells isn't inhabited by some tribe of Little People who stole their passage over in the cargo of the Half Moon, and now keep the rotting stumps decorated with bright-hued fungi and the gray stones painted with lichens.

Sit down on the sloping bank of the Aqueduct by the brook any moonlit summer night and up from the tangle of blackberries, Benjaminbush, and black cap raspberries in the ravine will come the music of orchestras of cicadas and crickets, playing wild unearthly little tunes for the nymphs of the brookside to dance to. And if you look close enough, down by the flat rock where the smooth black water pours over like melted glass, you will see—but perhaps the smoke and dust of houses has dulled your eyes, and you will not see anything! So what's the use?

As we go up the Aqueduct white-bibbed Peabody birds entice us to inspect the hedgerows and trees, and a yellow-hammer calls off somewhere down by the river. The next place in this neighborhood where Washington is said to have made a more or less protracted stay is the old Schuyler estate, now the International Garden Club's country house. If you ride up Broadway from New York you'll be attracted about here by a wonderful row of great old sycamores lining one side of the roadway, some of them nearly three feet thick at the base, reaching up their gnarled, mottled brown, green, gray and white trunks to massive ivory arms leaning over the sidewalk. The estate was one of the properties of the family of General Philip John Schuyler, the father-in-law of Alexander Hamilton. The imposing great house down beyond the Aqueduct is surrounded by lawns dotted with weeping-willows, English walnuts, white pines, sycamores, locusts, horsechestnuts and a few magnolias. On a lawn just beyond Irvington-on-Hudson we come upon a Maidenhair tree, *Salisburia adiantifolia,* the Ginko tree of Japan and China, which is to be seen on many of the streets of Washington.

THE AQUEDUCT, CROSSING SUNNYSIDE LANE

The tree folk that most impress us on our walk, though, are the sycamores, everywhere standing out in the landscape because of the snowy whiteness of the massive arms, these early spring days, that they stretch up to the skies as if to welcome their lover, the South wind. These Occidental plane trees are the cousins of the Oriental plane trees of Turkey and Greece, under which the ancient philosophers used to gather their students about them. There are beautiful specimens of the Oriental plane tree on the Thames Embankment in London and on Riverside Drive in New York, though the latter are young.

On the bank of the Aqueduct just before we come to Sunnyside Lane, above Irvington, a shaded and shrub-bordered roadway running down from Broadway to the rambling old home of Washington Irving at the river, we detect a faint fragrance beside the path. Stooping, we find the grass roots closely interwoven with wild thyme—and our hearts sing with Shakespeare:

LOOKING DOWN SUNNYSIDE LANE TOWARD IRVING'S OLD HOME

"I know a bank
where the wild
thyme blows,
Where oxlips
and the knod-
ding violet
grows,
Quite overcan-
opied with lus-
cious wood-
bine,
With sweet
musk roses and
with eglantine.
There sleeps
Titania some-
times of the
night,
Lulled in these
flowers with
dances and
delight."

The big yellow poplars, shagbark hickories, black birches, and cherries of Sunnyside Lane are dotted here and there with bird houses—the spirit of Irving, who received Louis Napoleon as an exile at his cottage on the Hudson, and who loved wild birds and speculated about their habits, we may believe, fully as much as he did about the spring the old Dutch woman brought over from Holland in a churn, seeming still to linger about the place. There is a cheerful little brook that babbles down through the Irving estate from Broadway past a spring near the Aqueduct, and, there being no taste of buttermilk, we stop to drink. Then we keep on up the path and come, just below Tarrytown, to where the Aqueduct cuts straight across the lawns of "Lyndhurst," the magnificent and beautiful estate of Mrs. Helen Gould Shepard—soft velvety lawns these spring days, and a little later we are entering the picturesque village of Tarrytown where, on the hills above, is the home of John D. Rockefeller, and, to the north, Sleepy Hollow, the little valley made famous by Washington Irving.

PHYTOPHOTOGRAPHY--OR THE SCIENCE OF PHOTOGRAPHING FLOWERS

BY R. W. SHUFELDT, M. D., C. M. Z. S., ETC.

(PHOTOGRAPHS BY THE AUTHOR)

IN SECURING photographs of flowers, to obtain the very best results one should be expert at photography in that special line; and, what is equally important, one should employ in the work the very best materials available, including the various modern appliances for taking color into consideration. It is most essential that one should have a thorough understanding of ordinary photography, supplemented by a familar knowledge of flowers and their habits of growth, in order to make a success of phytophotography.

There is no line of flower study—and there are many of them—in which the photographic camera cannot be used to the greatest advantage. This is especially true when we embrace the entire subject of general botany in the statement; for the photography of a tiny flower requires a very different kind of experience as compared with what is demanded in making photographs of trees, be the latter for artistic or for scientific purposes.

FIG. 1—BLUE VIOLETS, NATURAL SIZE, TAKEN AS THEY GREW

In such pursuits, we have in one field all that pertains to the science of micro-photography of flowers, in which we aim to pictorially illustrate the intimate structure of all the parts of trees and plants of every conceivable description. With this department I shall have nothing to do in the present article, nor will the question of the photography of trees be entered upon here; that is a subject which will be taken up later on as one having especial interest for the readers of AMERICAN FORESTRY. Studied in the gross, where the subjects admit of it, the camera may be used to depict the special parts of a very large number of species of plants, and the aim is to exhibit the comparative form of the seeds, the roots, stems, leaves, blossoms, and much besides; but this most important field will likewise be passed in the present connection.

Then we have the artistic photography of plants and flowers, including all departments of botany. A volume might easily be devoted to this branch of phytophotography, as the subject is as far-reaching as the range of plant-life itself. Floral designs, as we know, are used throughout the entire realm of art, in all of its branches, and the use of the camera here is of the greatest aid and importance.

FIG. 2—FIVE BLOODROOT PLANTS TAKEN *in situ*, GROWING AT THE BASE OF AN OAK TREE

Some half a dozen other well defined lines of photography, in their relation to botany, might be pointed out; but the one to be touched upon here is quite

SEVERAL PLANTS OF THE TINY WHITE VIOLETS

Fig. 3—Taken in the studio with indirect sunlight from one window and with reflected light from a white surface. Made-up surroundings, with a smooth surface of pine for background.

different from any of the ones named above, and it appeals particularly to those who spend much of their time in the field and forests of the country, to those who frequently have the inclination to photograph our wild flowers.

This work may be undertaken either indoors or in the open, and in the latter instance the flowers or plants to be photographed may be taken *in situ* or otherwise. When photographed in the studio, there are many points to be considered, any one of which, when disregarded, may lead to failure. For example, in the first place we are confronted with the problem of proper lighting; and in addition to this are matters of suitable backgrounds for different specimens, of correct posing, of maintaining the original freshness of the specimens, and the securing of detail and related values. Almost every specimen demands different handling, and we can well imagine that the number of specimens is practically limitless. This likewise applies to the conditions under which one works with respect to surroundings—indoors or out, to equipment, to climate, to the part of the world one may be in, and so on. Seasons also play their part, as well as the time of day. Further, it is a very different matter to photograph flowers out-of-doors in a swamp in the torrid tropics, than it is to attempt the same thing in the case of plants growing in the barren grounds of some subpolar region, or within the entrance of some cave or cavern in any part of the world. What will be dealt with in this particular are some of the ordinary problems of phytophotography, such as we may be confronted with during the spring and summer months in the north temperate parts of the United States.

First we may consider one or two examples of out-of-door photography of flowers and the lessons they have for us. There are at least three things to be borne in mind, and one of these consists in the choice of subject; then the matters of background and lighting are to be taken into consideration. Turning to Figure 2, we have five average Bloodroot plants in a group; they were photographed precisely as they had grown, and without the slightest disturbance of their surroundings. These flowers are not as perfect as they are sometimes found to be, while their leaves—in the first stages of growth—are both interesting and instructive; so much for our choice of subject in this instance. Now, as bloodroots are, in a very large number of cases, found growing at the base of some big tree, the picture in this particular is practically perfect, as no finer background could be chosen than the rough, gray bark of the oak here shown. Had this photograph been made on a moderately gray day, the result would have been perfect in so far as the *lighting* is concerned; but it was obtained on a very bright spring morning, in the full glare of the sun, and as a consequence nearly all detail of the delicate struc-

WILD GERANIUM OR CRANE'S-BILL PLANTS, BUDDING AND IN FULL FLOWER

Fig. 4—Taken *in situ*. Left side in semi-sunlight, right moderately shaded. Background of woods beyond. Small stop and several seconds exposure. Reduced one-third.

ture making up the central portion of each flower is entirely lost. This defect could have been easily overcome by someone holding a large, open umbrella at the right distance above the plants, so as to produce the proper amount of shadow for them; this may be done either by the operator or his assistant. If the former does it, he should have a least eight or ten feet of tubing to his shutter, in that he may stand in a place where the requisite shadow can be thrown, not only to include the plants but for a considerable distance about them.

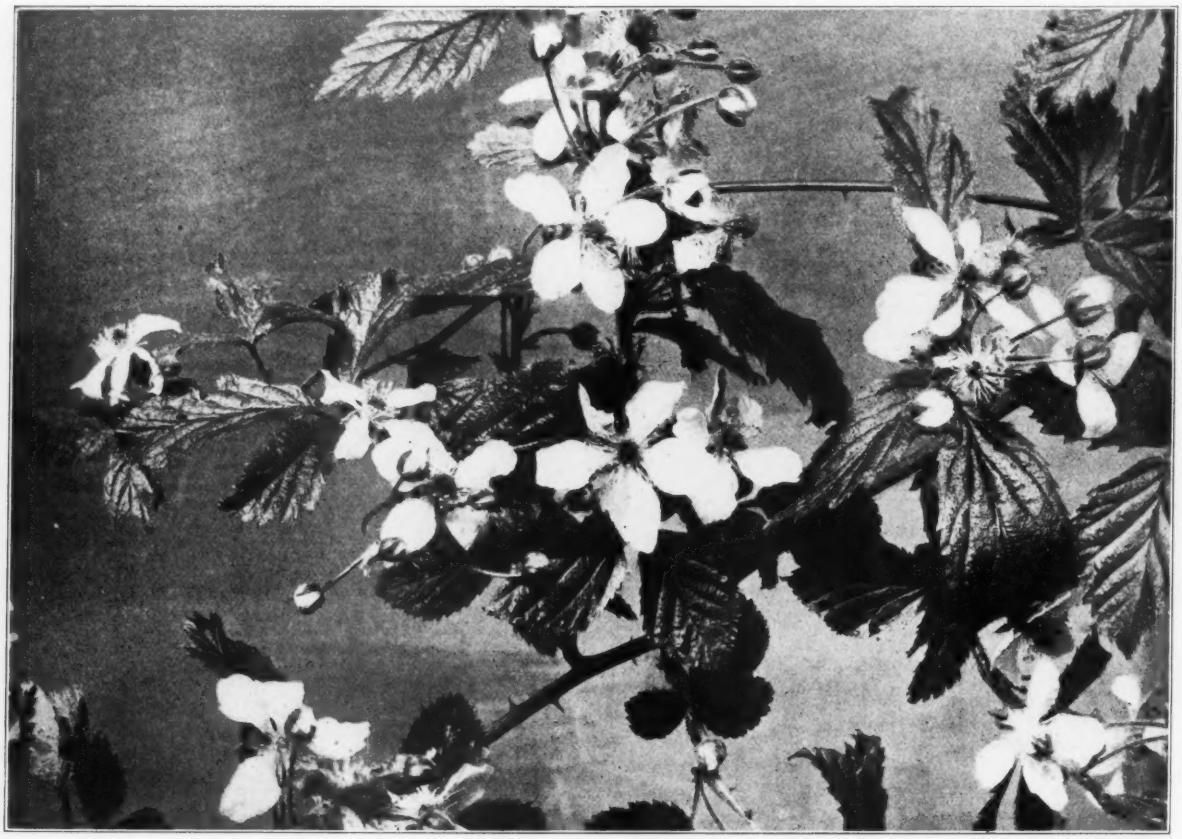
On "gray days" no such procedure is necessary; but when photographing wild flowers in the open on such occasions, especial attention must be paid to the selection of subject and background. A few years ago, when collecting examples to illustrate the present article, a big bed of the common, blue violet was selected for the purpose. After some ten or more studies on the ground-glass of my 5 x 8 camera, one was finally chosen, and a reproduction of a photograph made from the negative obtained is here shown in Figure 1. These flowers are of a rich violet color; but the thing to notice is that every delicate part of the structure of any of the three of them is reproduced in the minutest detail. In addition, the leaves of the plant almost entirely form the background, cutting out what is always a *most objectionable feature* in pictures of this class, namely all the vegetation in the background, which is conspicuously out of focus, notwithstanding your having used the smallest stop in your diaphragm. In this picture, where the leaves do not cut out this defect, the wonderfully deep shadows do, and this was anticipated through the precautionary study of the subject on the ground-glass. This result was obtained on a 5 x 8 rapid plate, with the plant natural size. A gray sky at noon tempered the light much better than an open umbrella could do, for the reason that the produced shadow or shading was general; whereas, in the case of an umbrella-shadow, it is deepest at the center and grows weaker toward the periphery.

AN UNUSUALLY FINE WILD GERANIUM PLANT OR CRANE'S-BILL

Fig. 5—This was photographed natural size indoors with proper sunlighting. Background of smooth pine surface—buffy yellow. Flowers pale purple. Detail of minute structure perfect. With ordinary lens pollen grains may be seen on anthers.

Sometimes you will come across the very subject you've been looking for all day after a hard tramp, with three or four miles ahead of you before you can reach home, and just as the sun is barely above the horizon; but there is no use of thinking about photographing the tid-bit. Only one alternative is left you, and that is to take them along with you. Suppose, for example, that the specimen or specimens be a group of the most ex-

quisite little white violets; the way to do is to take them up, roots and all, in the most careful manner, and transport them to the house in some carrier in which they will not be disturbed in the slightest degree. When proper precautions are taken, this is by no means a difficult feat; and when carefully planted over night in some suitable receptacle, they will be in excellent condition for photographing the following forenoon. Now comes the task which calls for all your skill; but knowledge of lighting, natural posing, the background, and the accessories are all so well exemplified in Figure 3, that to write the matter out in detail would only needlessly consume valuable space. This result was also made the size of nature on the plate; and it is interesting to note how



HIGH-VINE BLACKBERRY IN FULL BUD AND FLOWER

Fig. 6—Natural size; indoors. Room highly lit by sunlight as in Figure 7. Background, smooth pine board (buffy yellow). Great detail secured throughout entire photograph. Graceful arrangement. In Figure 7 and in this one, the sun does not shine directly on the plants.

distinctly one may discern the fine, white pubescence on the leaf and flower stems. The structure-detail of the flowers is likewise most perfect, and bears examination, in the photograph, with a powerful hand-lens.

Quite frequently we will meet with some plant bearing delicate flowers, from which the petals are easily shaken, and of which we desire a natural size picture, showing all the characters of the leaves, stems, and the structure of the blossoms. Such a plant is seen in the "high-vine blackberry;" and to photograph it *in situ* without introducing an objectionable, distracting background all out of focus, is practically out of the question. By obtaining a suitable specimen close to your home, however, and by photographing it under the proper conditions of light and background in your studio, such a result as is shown in Figure 6 may be secured. This was made with an instantaneous six and a half by eight and a half dry plate, the subject being natural size. With a good hand-lens the most minute structures of the buds and blossoms can readily be made out—in fact, they are quite visible to the naked eye.

There is another way, however, in which such a picture as this may be made by one skilled in such procedures. It requires a perfectly clear day, absolutely no wind, and a cloudless sky. By getting up on some desired elevation—such as a hill or a house-top—where there are no objects between your lens and the sky, the blackberry branch may be secured in some fashion so that the sky forms the necessary background, and you can focus on the desired portion of the specimen, natural size. The subject should be properly shadowed by the use of an open umbrella held above it. Considerable skill and judgment is demanded on the part of the operator in order to obtain perfect photographs in this fashion; still, it can be done, and the results, if perfect, will repay one for all the trouble they occasioned.

One of the most difficult plants to handle or to get good, natural size photographs of is the well-known wild

GIANT CHICKWEED PLANTS

Fig. 7—Taken *in situ*, natural size, during a sunny forenoon. No shading employed. Detail of most of the flowers lost. Background not attractive. Time, a few seconds with small stop. While it shows how the plants grow in nature, the general effect only is somewhat pleasing.

geranium or crane's-bill (Figs. 4 and 5). In the first place they wilt almost instantly upon being plucked. If taken up by the roots they last a little longer, though generally not long enough to have you reach home. Even under the most favorable conditions the plant commences to droop in the most aggravating way in about ten minutes, and this casts out the plan set forth in the last paragraph with respect to the blackberry branch. This wild geranium rarely or never grows where nature's background can be obliterated. Some say, why not use a white sheet or a similar white surface back of it, just where it grows in the woods? For the reason that its purple flowers take *white*, and would not show in the result (Fig. 4). A color-screen would help some, but not to the fullest required extent. Observe, too, in the case of this plant, what extremely flexible and delicate stems it possesses, and these likewise form a real menace to your success, should you attempt the photography of this species in the open, when the air is in motion even in the very slightest degree.

Now, having made up my mind not to be defeated in the matter of obtaining a perfect photograph of any small plant in existence, the same was secured of this troublesome geranium by selecting the most perfect specimen I could find in a piece of woods only a few hundred feet from my house. It was most expeditiously taken up, with a great quantity of earth about its tender roots. Placing the whole affair in a deep bucket having a little water in the bottom, and shading the plant with a newspaper, it landed in my studio in less than six minutes after it was taken up. A background was already arranged for it, and the camera was in complete readiness to make an instant exposure on a six and a half by eight and a half rapid, dry plate. This was promptly done, and in Figure 5 we have the satisfactory result; with a lens we may observe even the fine pollen upon the minute anthers! With the exception of its roots, every structure of this plant, at this stage of its growth, is in evidence and capable of being studied.

Occasionally, the Giant Chickweed gives one trouble, as may be seen by studying the result shown in Figure 7. These plants were wonderfully beautiful as they appeared when focussed on the ground-glass; and failure seemed a thing not to be dreamed of. Yet, what do we have? Why, one of the very kind of pictures that the student of phytophotography should ever aim to escape producing. Note that the central portions of nearly all the flowers are lacking in detail, and that there are no relieving shadows for the brilliantly white petals. This defect must be overcome, either by selecting a gray day for the trial, or by the use of the open umbrella, as described above. But then, the background is too dark and unattractive, making the contrast with the flowers altogether too strong. But ah! that's another matter. Giant Chickweed is by no means an uncommon plant in the districts where it is found; and the thing to have done here was to have selected a more promising subject

TWO SPECIMENS OF JACK-IN-THE-PULPIT

Fig. 8—Spathes, leaves and other parts; natural size; indoors, in full sunlight. White cardboard background. Result perfect.

in a more favorable locality. Experience will help a great deal in work of this class, but it must ever be seconded by the most indomitable patience on the part of the photographer, in order to attain anything like success. Mind, Figure 7 is not altogether lacking in value from the viewpoint of instruction, as it not only shows the form of the flowers and the number of the petals, but also the characters of the buds, the shape of the leaves, that these are placed *opposite* each other on black, branching stems; finally, as a plant, it generally grows in masses and probably in shady places,—which, by the way, is really the case.

In the phytophotographic field we often have to deal with a class of pictures—or produce them rather—that are of a severe scientific type. These need only have a background of the most immaculate white—an effect easily produced by the use of a large sheet of white cardboard, placed behind the subject at the time of photographing it, or what is still more effective, a big sheet of soft, white blotting paper. Two things should receive our careful attention in making pictures of this class: the choice of subject and the lighting during the time the exposure is being made. As such pictures are intended for the instruction of botanical students, the subject-plant chosen should exhibit as many of its characters as possible, and the specimens should be as nearly perfect as we can find them. In posing, these structures should all come squarely into view and be seen to the best possible advantage. A very perfect example of this class of phytophotography is reproduced in Figure 8. It is of a fine specimen of our common "Jack-in-the-pulpit," collected shortly after its appearance in the early spring. Needless to say, this result was secured indoors, and with strict observance of all directions set forth in the foregoing paragraphs. The stem-sheath is beautifully shown, as are the young leaves just emerging from it. Two fully developed "spathes" are in the picture, and their common characters are well shown in the left-hand one, which is perfect in all its parts. On the right side the emergence of flowers and leaf-stems from the sheath is well shown; some of the larger leaves are also in evidence, and the form they take on is shown quite distinctly.

If such a picture as this were used in any work of descriptive botany, it should be supplemented by one or two others, or maybe three. In a previous issue, AMERICAN FORESTRY has already published the ones referred to, and they are sections of the spathe to show the internal structure; one to show examples of the extraordinary root this plant possesses and how it varies in different specimens of the plant, and, finally, the fully developed leaves, with a picture of the ripe fruit. Our common Skunk Cabbage was dealt with in a similar fashion in AMERICAN FORESTRY, as have quite a number of other representatives of our flora of the Middle Atlantic States.

Most of our handsomest and more or less exhaustive works upon botanical science—whether general in nature or devoted to restricted areas—employ the last class of illustrations here described, and for very obvious reasons. No good student of flowers is benefited by having the pictorial side of the works he is studying obscured by hazy, dark backgrounds; faulty posing and selection of subjects; obscurity due to the matters of lighting and backgrounds, or to any other class of defects.

This contribution will not have been written in vain should it induce those making photographic pictures of flowers with the view of publishing them to take heed of some of the pitfalls that occur along the highway to ultimate success in such pursuits, upon which it has been the aim of this article to throw a little helpful light.

AT a recent meeting of the Board of Regents of the University of Washington, the name of the College of Forestry was changed to College of Forestry and Lumbering. While the term forestry, when viewed in its broadest sense embraces lumbering, the work at the University of Washington has broadened out so as to cover practically every phase of the lumbering industry, and in this respect differs from practically all other forest schools.

In addition to the work ordinarily covered in the forestry curriculum, Washington offers opportunities for specialization in general forest products, logging engineering, and the business of lumbering, the latter including new courses in milling and marketing. Expansion along these lines was necessary to meet the needs of the industry in the Pacific Northwest. The courses in logging engineering and forest products have now become thoroughly established and won recognition in the industry to the extent that the demand for the graduates, particularly in logging engineering, has far exceeded the supply. It is expected that the same will be true in the course covering the business of lumbering as soon as this becomes well established.

A PROCLAMATION creating the Alabama National Forest has been signed by the President. About 10,500 acres of public lands, in Lawrence and Winston counties, in the northern part of the State, which had been withdrawn from entry, are included in the new National Forest. In addition the Government has purchased approximately 12,000 acres and has options on an additional 13,000 acres in the same locality. It is expected that, by further purchases, the Forest will eventually be enlarged to include about 150,000 acres.

ON APRIL 3 and 4, at the New National Museum at Washington, District of Columbia, was organized the American Society of Mammalogists. The policy of the society will be to devote its attention to the study of mammals in a broad way, including life histories, habits, evolution, palaeontology, relation to plants and animals, anatomy and various other phases. The society will publish the Journal of Mammalogy, in which popular as well as technical matter, will be presented.

PLANT A MEMORIAL TREE

FORESTRY AS A VOCATION

BY H. H. CHAPMAN

WITH the return of nearly two million young men from the trenches and the varied activities of military life in France, comes a heightened interest in forms of outdoor employment. The appeal of forestry as a vocation has always drawn a class of young Americans whose love of the woods and of the hardships of the trail is combined with a desire for public service for scientific achievement, and for clean, practical effort.

Probably no profession holds a greater lure for those who rebel against the confinement of indoor occupations and have a genuine love for the woods and mountains, yet no calling is so little understood in America today as this modern vocation of forestry.

Forestry is the art of maintaining forests for the benefit of mankind. It is, first and foremost, a *land* question, for forests are the product of forest soils. Since forests as such must occupy land to the exclusion of agricultural crops or of fruit trees, forestry is based on the proper segregation of lands into the two fundamental classes, agricultural lands and forest lands. The forester's vocation usually excludes agriculture, but he is frequently called on, in co-operation with agricultural and soil experts, to conduct these land classifications. For this reason, a knowledge of farming is of great value to the forester.

The status of the land once determined, the forester's object is so to manage these forest areas that the greatest possible sum or combination of benefits may accrue to the communities dependent on them. These benefits are threefold. First, may be mentioned the use of the forest for recreation. This use has the widest appeal to sentiment, and is invaluable for maintaining health of body and mind for our increasing population of city dwellers. Areas set aside *exclusively* for this use are known not as "forests" but as parks, and while the forester as such can perform invaluable services in protecting the forest from fire, insects, diseases, and other enemies, he cannot here bring into play the full exercise of his abilities, for this includes the cutting and utilization of timber which is usually prohibited on such areas. The care and preservation of game, a specialty in which the forester is profoundly interested, will find its fullest development on large park areas.

The second great benefit from forest areas is the protection they afford to our soils and water supplies. Perhaps this is the best-known and best-understood function of a forest cover. In maintaining the flow of springs, in preventing the erosion of surface and the silting up of rivers, in reducing floods and prolonging the flow of streams in dry periods, the maintenance of forest cover is essential. Here, again, the forester's function is the protection of existing forests. But both in parks and protection forests there is the frequent necessity of reestablishing by artificial means the forest cover on slopes denuded by fire or by destructive lumbering. In this latter role the forester must be a tree planter and must get his results, not as the ornamental nurseryman does, by pampering the individual plant, but on a large scale, with small stock, at minimum expense, and in competition with such destructive forces of nature as drought, wind, insect pests, rodents, frost, snow, and grazing animals.

But the real art of the forester lies in the management of the forest for the continuous production of wood in all its forms. Wood must serve us in many capacities, such as for fuel, buildings, furniture, paper, vehicles, and so on in an ever-widening circle. It cannot do so unless trees are cut, logged, transported, manufactured, and laid in a finished form at the door of the consumer. The cutting down of mature forests is necessary to the comfort and well-being of the very individual who declaims against this destruction because of his sentimental regard for the forest in its natural state. The lumberman has built up an enormous business whose exclusive concern is to supply the economic demand for wood products by taking from the forest the raw product of nature, the mature tree, and converting it into lumber from which by other processes finished products are made. It is not the business of the lumberman, as such, to do more than this. And as long as the supply of virgin timber holds out in America, the lumberman will continue to draw upon it as if it were inexhaustible. His business *begins* with the felling of the tree; the forester's business, as such, sees its completion in the same process. Forestry precedes and underlies the lumbering of the future. The true business of the forester is to grow the timber which ultimately finds its way into the economic life of the nation. Just as one agricultural crop must be harvested before another is grown, so a mature crop of trees must be cut before a young, vigorous second growth can appear. The forester's art is so to cut this timber that the forest will reproduce the most valuable species. Only by accident does this result occur naturally, following the operations of modern logging, and it never happens more than once on the same site. The worthless brush and forest weeds which spring up so frequently on old cuttings have about as much resemblance to commercial forests as thistles have to wheat. They are both green in season! Not that the lumberman can not manage his lands as forests should be managed if he sets out to do so, but that he too often has no interest in the land itself except to get rid of it as soon as the mature timber is cut. He owns it in order to assure to his business an early supply of raw material, wood.

The forester, then, is one who manages forest land for the purpose of growing trees and maintaining the productivity of the soil and of the forest. Do lumbermen employ foresters? They have need of timber cruisers to estimate the volume of their merchantable timber, of logging engineers to lay out their railroads and logging

operations, of woods foremen to superintend the logging, and of inspectors to secure close utilization of the tree. There are many openings along these lines, as well as in the milling, manufacturing, and selling end of the business, but none of these is forestry, however *essential to forestry* these operations are. When the lumberman, as a *land owner,* adopts the policy of reproduction and growth of trees, and sets out to retain indefinitely the ownership of cutover land for the possible future revenue obtainable from such management, then the forester will find an opportunity to practice his true vocation as manager of such tracts. His education as a forester may fit him meanwhile for useful employment along these kindred lines. In other words, the character of land ownership and the purpose of the owners determine whether the work of the forester constitutes the practice of his vocation or of some other line associated with lumbering or manufacturing. The men who worked in the French forests with the forestry regiments can bear witness to the truth of this statement. For over there, about half of the forested areas are publicly owned, and on the rest, the private owners have practiced forestry for decades, even for centuries; otherwise there would be no French forests! Every acre of these forests, no matter how owned, has been produced directly by the art of the forester; and the French forests saved France as truly as did the American army.

In America, due directly to our superabundance of virgin timber, private owners, as a class, could not afford and did not care to undertake the expense of producing timber; the competition with virgin forests prevented it. So it has come about that *forestry,* and employment for foresters as such, has developed principally on the National forests under the United States Forest Service, which controls 155 million acres of public lands set aside for timber production. The Forest Service employs over 2,500 forest rangers and officials of higher grade. At present, the larger number of men is taken into the Service as rangers after their passing an examination to secure Civil Service rating. This examination is given annually, in the fall, and is based upon familiarity with certain essentials of the work of a ranger, such as compass surveying, handling small timber sales, the administration of grazing for forest users, fire fighting, trail or road building, packing supplies, and making out reports. Western experience counts for much, and before taking the examination it is customary for an applicant to seek a position as forest guard, fire lookout, or "temporary" ranger during the season preceding the examination. Applications for such employment may be made to the District Foresters at San Francisco, California; Portland, Oregon; Missoula, Montana; Ogden, Utah; Denver, Colorado, or Albuquerque, New Mexico. These positions pay a salary of $1,100, increasing by promotion to a maximum of $1,500. Many rangers have only a common-school education, but the opportunity for *advancement* beyond this grade is largely determined, first, by the amount of additional education possessed by the rangers, ranked in order as graduates of high school, college, or technical school of forestry; second, by their character and ability to master the work, take responsibility, exercise initiative, and become good executives. The second method of entrance into the Forest Service is by passing a highly technical examination for the Civil Service grade of Forest Assistant. This requires a complete course of training at a technical school of forestry, equivalent to a 4-year college course with one year of post-graduate work. The Forest Assistant is frequently assigned to ranger work on entering the Service. The benefits of entering the Service as Forest Assistant lie largely in the educational training obtained previous to employment. Forest Assistants are also given work in research at Forest Experiment Stations, in timber-sale administration, timber estimating, grazing inspection, and general administrative work. If they show adaptability and character, they, as well as rangers, may become Forest Supervisors at salaries from $1,800 to $2,400, or eventually may obtain higher executive positions paying up to $3,600 in the District Offices or at Washington.

Certain States, as New York and Pennsylvania, which own large areas of land set aside as State forests, employ foresters. Pennsylvania educates her own State foresters at the Forest Academy of Mont Alto. New York secures hers by Civil Service examination in technical forestry.

The employment of foresters by owners of private lands will steadily increase from now on as land owners begin to realize that non-agricultural land can be made to yield an income in no other way. Paper companies, with millions invested in plants, are apt to desire a permanent output from their spruce lands, and they employ foresters to secure this end. Mining companies in regions where the supply of virgin timber is nearing exhaustion are taking an interest in forestry and foresters. Railroad corporations, driven to produce tie timber locally, are employing foresters to attain this object. Owners of large estates composed of woodland, and institutions with forest lands are realizing the need of employing foresters properly to care for their properties.

A host of small land owners exists such as farmers or owners of small estates, who can and should practice forestry on woodlots and waste places. These tracts are not large enough to justify employing a trained forester. To supply the wants of these owners, States have established forestry departments for public education in forestry, as well as to secure fire protection on forest lands. This educational work gives employment to a few foresters who have special gifts for public work, or who are needed for forest "extension" work among land owners. In addition, forest rangers are employed to specialize on fire patrol and prevention.

Finally, come the forest schools, whose business is to train and educate the foresters. Schools exist for the training of forest rangers and foremen of forest estates, which usually give a one-year course, mostly in the practical work of a ranger, such as that of fire suppression, tree planting, marking timber for cutting, surveying, and of other lines. A still larger number of college schools of forestry have been established. The recognized stand-

ard for adequate professional training is a 5-year college course based on the sciences of botany, physics, mathematics, and political economy.

The work of a forester may begin in the solitude of the wilderness, with the survey, topographic map, and estimate of timber, but it comes back to contact with men. The purpose of forest management is to serve mankind, and in working out these problems of service not merely for next year but for decades to come, the forester acquires a breadth of vision and an insight into economic laws which make for the building of character. His profession demands of him a rugged physique and ability to endure hardship, yet lifts him out of the monotonous drudgery of manual labor. No calling makes such varied demands on the individual, or so stimulates all-around development. The forester, in order to rise to the top of his profession, must be able by close observation to analyze the living forces of nature as expressed in the growth of trees and the survival of seedlings, and must control these forces to secure the ends desired. This requires scientific bent of mind and training. He must have an intelligent appreciation of engineering problems which are often the key to the use of forest resources, and must be alive to the economic needs of communities, that he may shape the forest management to supply them. But he must also be a public leader, to secure co-operation in fire protection, create sentiment favorable to the establishment and continuance of forest policies, and secure beneficial legislation.

The foresters of America face a task which is only just begun. They have, however, shown themselves to be equal to their responsibilities, and to possess a knowledge of their common aims and ideals. Each member of this new profession strives to wrest from nature the control of her life-giving processes, and from man the recognition that foresight, conservation, and thrift must take the place of unrestrained exploitation of natural wealth in timber if our national prosperity is to continue.

FOREIGN NURSERY STOCK INSPECTION

THE main arguments of objectors to plant quarantine No. 37 are that either no pests are brought in on such imported stock or that thorough inspection abroad would eliminate any undesirable insects. There is no question but that the chief exporting foreign governments have given to their nursery stock the best inspection which human skill and science can afford. Failures are due to the human equation and to conditions not subject to change, which make inspection and certification insufficient safeguards.

The inadequacy of such inspection since 1912, when it became operative, is shown by the findings resulting from reinspection of imported material at destination in this country. Data gathered by the United States Department of Agriculture show that there have been received from Holland and Germany 3,161 infested shipments, involving 486 kinds of insect pests. Many of these intercepted insects are not known to be established anywhere in this country and numbers of them, if established, would undoubtedly become important farm, garden, or forest pests.

Under the system of inspection which has been established in the principal exporting countries there is little excuse for the passing and certification of stock infested with the egg masses of the gipsy moth or with the large and rather conspicuous leafy winter nests of the larvæ of the brown-tail moth. In point of fact, however, during the period in which the highest possible grade of inspection has been enforced, no less than 52 different shipments of plants from foreign countries have been found to be infested with egg masses of the gipsy moth or larval nests of the brown-tail moth. Three of these were from Japan and the others were from France, Holland, or Belgium.

Unfortunately, these records do not necessarily comprise the total entry of these two pests. They represent merely the instances of infestation discovered by reinspection on this side. There is, therefore, the possibility that one or both of these pests have already gained foothold at one point or another in the United States and have not yet been discovered and reported. In this connection, it should be remembered that the gipsy moth was 20 years in Massachusetts before it was known, and this in the face of the fact that the infestation started in a thickly populated suburb of Boston.

That foreign inspection gives no real security is sufficiently shown in this record relating to two insects for which there is little, if any, excuse for overlooking.

The establishment of these two insects in different parts of the United States would soon lead to their general spread throughout the country. What this would mean in cost and damage and also in human suffering can hardly be estimated. Only a portion of the New England States is now invaded by these insects, and yet the expenditure in clean-up and control work alone amounts to more than a million dollars a year by the States concerned, in addition to aiding Federal appropriation of upward of $300,000 annually.

An important consideration in relation to the brown-tail moth is that in addition to the actual damage to deciduous forests, orchards and ornamental plantings, the larval hairs which are shed and fill the air at the time of the transformation of the insect to the chrysalis stage have an intensely irritating or nettling character, which causes a great deal of inflammation to the exposed parts of the human skin, such as the neck, face, and hands, and this irritation, in one or two known instances, and perhaps in others, has been the cause of death by affecting the lungs and leading to fatal cases of tuberculosis. Should the brown-tail moth reach the South and Southwest this irritation to human beings would doubtless be increased by reason of greater warmth and by the moisture of the skin and consequent greater likelihood of adherence of the larval hairs.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

THE idea of reforestation to provide for the future wood supplies of large pulp and paper industries is spreading rapidly. The Laurentide Company, Ltd., and the Riordon Pulp and Paper Company, Ltd., will plant 750,000 and 900,000 spruce, respectively, besides some pine. Price Brothers, Ltd., are starting a nursery and will make a small plantation. The Canada Paper Company will plant on a small scale. The Belgo-Canadian Pulp and Paper Company, Ltd., and the Abitibi Pulp and Paper Company are preparing their plans for an extensive planting program. No word has been received from the Pejepscot Company, which was one of the pioneers in reforestation and which has been planting at intervals for some years. If the plantations of these important companies are successful the movement will spread rapidly and will be a great benefit to the industry placing it on a more permanent basis than ever before.

His Majesty, King George, congratulates a Canadian lumberjack on his uncommon skill in felling a tree.

The Council of the Woodlands Section of the Pulp and Paper Association have decided to accept the invitation of Mr. G. C. Piche, Chief Forester of Quebec, to hold a conference the end of June at the Quebec Government Nursery at Berthierville, about 40 miles from Montreal. He has kindly consented to let the Section have the use of the commodious building for the meeting and this bids fair to be one of the most interesting and important meetings ever held to discuss lumbering and forestry. Logging methods, slash disposal, reforestation, the diameter limit regulation, fire protection and other subjects will be thoroughly discussed. The Laurentide Company has issued a cordial invitation to the members of the Section and their guests to visit its nurseries and plantations near Grad' Mere after the Berthier meeting. American lumbermen and foresters are heartily invited to attend and take part in the discussions.

The Berthier Nurseries have been in operation for a number of years and have supplied a large amount of planting stock and also ornamental and windbreak trees to farmers. The Government now proposes to increase the output as soon as possible to five million trees per annum. This will make this one of the largest nurseries in the country and will enable the Government to supply limit holders with trees and also to undertake planting on its own account.

Dr. J. S. Bates, since its inception the chief of the Dominion Government Forest Products Laboratories, at McGill University, Montreal, has resigned his position to direct a research department for Price Brothers Company, Ltd. This will be a great loss to the Laboratories, which have done excellent work under Dr. Bates. He also represented the Imperial Munitions Board at Shawenegan Falls where much excellent work was done during the war in the manufacture of acetone and many other important chemicals. The new field which he is entering, that of the profitable use of the by-products in the manufacture of sulphite pulp, is one which is rich in

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possibilities for new products and for profits. There is also the question of the utilization of hardwood in the manufacture of paper which it is hoped will be taken up.

Don Ricardo Codorniu, who has been for many years in charge of reforestation, drifting sand work and prevention of flood damage by mountain torrents in Spain, has been elected an honorary member of the Canadian Society of Forest Engineers. He has been for a long time one of the moving spirits in *Los Amigos del Arbol*, the Spanish Forestry Association and is the editor of *Espana Forestal*, a very interesting and well gotten-up forestry journal. The illustrations in this paper are exceptionally good and the articles well worth reading. The order of Isabella the Catholic was bestowed on Senor Codorniu a few years ago by popular petition. Senor Codorniu is an enthusiastic Esperantist.

The British Columbia Forest Service will again use a hydroplane for forest patrol. The first attempt failed owing to an accident in which the pilot landed on the roof of a house and went through into the bedroom of one of the occupants.

Sometime during the coming summer the Dominion Forestry Branch will test out an aeroplane in the Province of Alberta. The machine will be specially altered to meet the requirements of fire protection work.

Prof. R. B. Miller, who has been in charge of the Forestry Department at the University of New Brunswick, is at Yale where he has been acting as lecturer in the Forest School on Forest Management. He is also taking special post-graduate work.

The Co-operative Fire Protective Associations in Quebec have purchased moving picture machines and will carry on a campaign in the rural districts and those remote from the railways to educate the people in the need for fire protection and forest conservation. The educational program carried on by these associations has in the past done more than anything else to reduce the number of fires and the people are learning that they are partners and co-owners with the limit holders and have a large stake in the forests. In many parts of Quebec the farmers could not live if they were not able to work in the forests in winter.

Major A. R. Lawrence has come forward with a proposal to put forest ranging and game protection under a semi-military organization in Ontario, something along the lines of the famous Northwest Mounted Police. This might possibly be a success if it were as well handled as that celebrated organization, but something would have to be done to find work for the men in the winter and the cost might make the taxpayers think twice before adopting it.

The exports from Canada's forests, as shown by the bulletin of the Department of Trade and Commerce for the year ending November, 1918, were $64,281,861, or an increase of 22 per cent over the previous year. This was double the amount of fishery exports and 85 per cent of that of minerals. In addition to these primary forest products wood-pulp amounting to $32,580,619 was exported. The pulp and paper industry is the most important by far for the Province of Quebec.

The Abitibi Pulp and Paper Company has become one of the co-operators with the Commission of Conservation in the study of cut-over pulp wood lands. This research bids fair to be of the utmost importance for the determination of proper silvicultural methods in the handling of these lands and is throwing much light on the subjects of reproduction and growth.

The necessity for an inventory of the forest resources of Canada is becoming more and more pressing. The results of the Commission of Conservation's work in British Columbia will be published shortly. Nova Scotia has been covered, an intensive survey of New Brunswick is under way, but Ontario and Quebec, next to British Columbia the most important forest provinces, still have very little knowledge of the extent or amount of their resources. A little work has been done by private owners, some of whom have made intensive surveys of sections 2,500 to 3,000 square miles in area. The only bases for estimating over large sections are the results of such surveys and some of a few hundred square miles made by the Provincial Forestry Services. The aeroplane offers such a rapid and easy method of reconnaisance for these huge areas, inaccessible in any other way, that work of this character must be undertaken very soon. The permanence of the lumber and paper industries is of vital importance for eastern Canada and the industries themselves are doing more than their share of the work to insure it.

The Laurentide Company, Ltd., which made a successful experiment in grinding hardwood for pulp last year is preparing to conduct experiments in barking both with knife and drum barkers. It has been said that hard wood barks in drum barkers easier than spruce. Experiments are also under way in regard to driving this wood by water. Should the experiments prove successful a means will have been found to lessen materially the drain on our waning soft wood supplies.

NEW BRUNSWICK FOREST SERVICE STAFF CONFERENCE

BY ELLWOOD WILSON

MANY of the Forest Rangers, Scalers, Game Wardens, and Fire Wardens of the outside staff of the Crown Land Department met in Fredericton on Wednesday and Thursday April 2 and 3. The Conference has been called by the Forestry Advisory Commission with a view to considering improvements in the methods of scaling, fire protection and game protection in the interests of efficiency.

The main part of the program called for a practical discussion by the Rangers themselves of many of the questions under consideration, although a number of outside speakers also addressed the Rangers.

GEORGIA TRAINING FORESTERS FOR THE WAR DEPARTMENT

DURING the war the forester, as much as the chemist and engineer has demonstrated his worth. In connec-

tion with the first Engineering Corps there was recruited a "Forestry Contingent," and, even before this, various New England states had sent over a number of forestry units to assist England in logging and manufacturing her forests. During the past year the War Department has been busy recruiting a Forestry Corps for duty in France. The fact is that this war was largely an engineering problem; hence the unparalleled demand for that greatest of all construction materials—wood. Transportation lines must have wood for ships, for cross-ties, for bridges, and for cars. Of what value would food and soldiers have been if we had not the means of transporting them to where they are needed?

The crowning achievement of the great war is the wonderful way in which the United States organized her resources towards the successful culmination of that project. With the approval of her people the Government took over the direction of railways, ships, munition factories, mines and whatever was needed in pushing the war. The State universities and colleges became great training camps in preparing men for technical projects under the War Department. In the Students' Army Training Corps men with the proper preparation were given an opportunity to secure military instruction while fitting themselves along some specialized line of endeavor. Courses of study were modified so as to eliminate all but the essentially practical; the emergency demanded intensive but thorough training. Instead of requiring four years to graduate an engineer, forester or chemist, the same result must be achieved in a half or a quarter of the time. No thought could be given to college credits; the object was to give the Government the efficient men it demanded and in the shortest time possible. It was with this thought in view that the two-year course in Forest Engineering was organized at the University of Georgia. The subject matter of the course was arranged with the approval of the Committee on Education and Special Training, War Department.

The specialized course in Forest Engineering covers a period of two years, although each year is largely independent of the other and each term of the other. This means that a man may enter at the beginning of any term and successfully pursue the work. The year is divided into four terms of twelve weeks each. The fourth term of each year is conducted in the woods on a logging or milling operation, where the men have an opportunity to become proficient in the handling of machines, instruments and tools.

The course covers a period of two years, the year consisting of four terms of twelve weeks each. Three terms of each year will be spent at the University; the fourth on some woods or milling operation. The understanding is that these students will be permitted to complete the period of training. For this reason the subject of forestry has been placed in the same category as the subjects of medicine, engineering and agriculture.

For futher information address the Chancellor, University of Georgia, Athens, Georgia.

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ARMY AIRCRAFT TO FIGHT FOREST FIRES

ARMY airplanes and captive balloons will cover portions of the National Forests of California, Arizona, New Mexico, and other States this summer, to aid in detecting and supressing forest fires. In compliance with an order from Secretary Baker directing the Air Service to cooperate with the Forest Service of the United States Department of Agriculture in this work, conferences are under way to determine where, and to what extent the air scouts will supplement the forest rangers.

That there is a distinct and important place for aircraft in fire protection of timberlands is regarded by the forestry officials as beyond doubt, but experimental trial of methods and possibilities will have to be the first step. This is now being planned for the coming fire season. Army airdromes and bases will be utilized for the experiments. Some of the bases near enough to National Forests to be used advantageously are the flying fields at San Diego, Riverside, and Arcadia in southern California. Other points in the West and in the East are under consideration, including one near the White Mountains in New Hampshire.

One of the interesting possibilities to be tested is bombing fires to put them out. It is believed that bombs charged with suitable chemicals can be used with good results. Another plan to be tested is transporting fire-fighters by dirigibles from which ladders can be lowered to the ground.

The chief use of the aircraft this summer, however, will be for fire detection. At present the Forest Service relies for this partly on patrol, usually by men on horses, motorcycles, or railroad speeders, and partly on watchers stationed at lookout points. Aircraft have many points of obvious superiority for both classes of detection work.

Lookouts in a very broken country, cut up by deep canyons or where mountain ridges obstruct the view, or in a flat country that affords no good points of vantage, are often unable to pick up all fires quickly by the rising smoke, or to locate them accurately. For precise location the system in use depends on triangulation through reports telephoned from separate observation points. Airplanes would use wireless in reporting fires, as they have done in communicating with the artillery, and would locate fires by co-ordinates in the same way that gun fire in war is directed to a particular spot or object.

From the Army standpoint, the use of aircraft in protecting the National Forests affords a valuable opportunity for training flyers and developing further the possibilities of aircraft and the art of flying.

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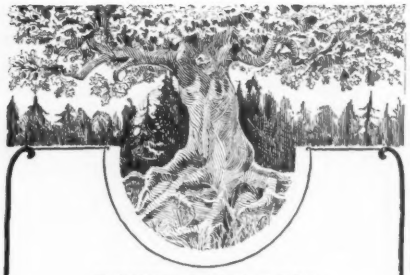

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CURRENT LITERATURE

MONTHLY LIST FOR APRIL, 1919

(Books and periodicals indexed in the library of the United States Forest Service.)

FORESTRY AS A WHOLE

Proceedings and reports of associations, forest officers, etc.

British Columbia—Dept. of lands—Forest branch. Report for the year ending Dec. 31, 1918. 27 p. Victoria, 1919.

California—State forester. Seventh biennial report. 1916-18. 103 p. pl., tables. Sacramento, Cal., 1919.

Montana—State forester. Fifth biennial report, 1917-18. 99 p. il., map. Helena, 1918.

New South Wales—Forestry commission. Report for the year ended 30 June, 1918. 32 p. Sydney, 1918.

Washington—State board of forest commissioners. Annual reports, Washington state forester, for the years ending Nov. 30, 1917, and Nov. 30, 1918. 31 p. pl. Olympia, 1919.

Western Australia—Woods and forests dept. Annual report for the year ended 31st Dec., 1917. 24 p. Perth, 1919.

FOREST EDUCATION

Forest schools

India—Imperial forest college, Dehra Dun. Progress report for the year 1917-18. 28 p. Calcutta, 1918.

New York state college of forestry. The New York state ranger school on the college forest at Wanakena, N. Y. 27 p. il. Syracuse, 1918. (Circular 24.)

FOREST DESCRIPTION

Black, Robson. Canada's forests as an imperial asset. 16 p. Ottawa, Canadian forestry association, 1919.

FOREST BOTANY

Brown, W. H. and Fischer, A. F. Philippine bamboos. 32 p. pl. Manila, 1918. (P. I.—Bureau of forestry. Bulletin 15.)

SILVICULTURE

Planting

Devil's Lake nursery. Trees for the prairie; their value and why. 16 p. Devil's Lake, N. D., 1914.

U. S.—Dept. of agriculture—Office of dry land agriculture. Care of co-operative shelter belts on the northern Great Plains. 7 p. Wash., D. C., 1919. (Publication No. 4.)

U. S.—Dept. of agriculture—Office of dry land agriculture. Conifer additions to shelter belts on the northern Great Plains. 7 p. Wash., D. C., 1919. (Publication No. 5.)

FOREST PROTECTION

Insects

Blackman, M. W. and Stage, H. H. Notes on insects bred from the bark and wood of the American larch. 115 p. tables Syracuse, N. Y., 1918. (N. Y. state college of forestry, Syracuse university. Technical publication No. 10.)

Swaine, J. M. Canadian bark beetles, pt. 2: Preliminary classification, with an account of the habits and means of control. 143 p. il., pl. Ottawa, 1918. (Canada—Dept. of agriculture—Entomological branch. Bulletin 14.)

Diseases

Cook, M. T. Common diseases of shade and ornamental trees. 27 p. il. New

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Southern Pine Association
J. B. WHITE, Kansas City, Mo.
I. E. RHODES, New Orleans, La.
HENRY E. HARDTNER, Urania, La.

Brunswick, N. J., 1918. (N. J.—Agricultural experiment station. Circular 98.)

Rhoads, A. S. The biology of Polyporus paragamenus Fries. 197 p. il., pl. Syracuse, 1918. (N. Y. state college of forestry, Syracuse university. Technical publication No. 11.)

FOREST MANAGEMENT

Graves, H. S. Private forestry. 11 p. Wash., D. C., 1919. (U. S.—Dept. of agriculture—Office of the secretary. Circular 129.)

FOREST UTILIZATION

Wood-using industries

Barton, J. E. The regenerative forests of eastern Kentucky and their relation to the coal mining industry. 4 p. Frankfort, 1919. Ky.—State forester. Circular No. 8.)

Brown, W. H. and Fischer, A. F. Philippine forest products as sources of paper pulp. 13 p. il. Manila, 1918. (Philippine Islands—Bureau of forestry. Bulletin 16.)

Paper makers' directory of all nations, 27th edition. 720 p. London, Dean & Son. ltd., 1918.

Post's paper mill directory, 1919. 644 p. maps. N. Y., L. D. Post, 1919.

Lumber industry

Smith, F. H. and Pierson, A. H. Production of lumber, lath and shingles in 1917. 44 p. Wash., D. C., 1919. (U. S.—Dept. of agriculture. Bulletin 768.)

WOOD TECHNOLOGY

Alvarez, A. C. Some tests of Douglas fir after long use. 118 p. pl., tables. Berkeley, Cal., 1918. (University of California publications in engineering, v. 2, No. 2.)

Brush, W. D. Size and quality of southern pine timber. 30 p. il., maps, tables, diagrs. New Orleans, La., Southern pine association, 1919.

AUXILIARY SUBJECTS

Conservation of natural resources

Maryland—Conservation commission. Official bulletin No. 7. 32 p. Baltimore, Md., 1919.

Maryland—Conservation commission. Third annual report, 1918. 86 p. pl. Baltimore, Md., 1919.

Parks

Connecticut—State park commission. Report for the two fiscal years ended Sept. 30, 1918. 36 p. pl. Hartford, Conn., 1918.

PERIODICAL ARTICLES

Miscellaneous periodicals

American city, Feb., 1919.—Tree planting an important part of city reconstruction programs, by P. S. Ridsdale, p. 189-91.

American sheep breeder, Jan., 1919.—Utah and the Forest service, by H. E. Fenn, p. 34-5.

American sheep breeder, Apr., 1919.—Grazing allowances, by W. C. Barnes, p. 218-19.

Bulletin of the Pan-American Union, Feb., 1919.—Rocky Mt. national park, p. 161-71.

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Colorado highways bulletin, Apr., 1919.—Million-and-quarter for Colorado-Wyoming national forest roads appropriated this year, p. 8.

Country life, N. Y., Apr., 1919.—Maple sugar making, by E. I. Farrington, p. 98.

Country life, London, Jan. 4, 1919.—The value of fallen tree leaves, by E. Beckett, p. 14-15.

Cut-over lands, Mar., 1919.—Industrial uses of cut over timber, by J. E. G., p. 1-2.

Gardeners' chronicle, Mar. 1, 1919.—Tree planting by the state, by A. D. Webster, p. 94.

Illustrated world, Jan., 1919.—Turning spruce forests into airplanes, by W. F. French, p. 696-701.

Journal of home economics, Oct., 1918.—Paper textiles, by L. B. Storms, p. 451--6.

Journal of the New York botanical garden, Jan., 1919.—The planting of trees as war memorials, p. 1-2; Insects attacking shade trees, by W. A. Merrill, p. 5-6.

Nation's business, Apr., 1919.—The task of the trees, by A. H. Ulm, p. 16-18.

Outers' book-Recreation, Apr., 1919.—Harvesting spruce gum, by V. C. Isola, p. 201, 250; Building the modern split-bamboo rod, by W. A. Stolley, p. 224-5, 256-7.

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Overland monthly, Feb., 1919.—Spruce and its future, by L. K. Hodges, p. 95-103; Reclaiming the fire swept areas of the west, by L. Roller, p. 171-6.

Reclamation record, Apr., 1919.—The Everglades, p. 171-3.

Scientific American, Jan. 18, 1919.—Forest fires of spontaneous origin, by G. Raymond, p. 47; What machinery is doing for the walnut industry, by H. C. Kegley, p. 51, 62.

Scientific American supplement, Feb. 22, 1919.—Manufacture of charcoal as an economic measure, by H. Sylven, p. 124-6.

Scientific American supplement, Mar. 1, 1919.—The grass tree resins of Australia, p. 137.

Scientific American supplement, Mar. 22, 1919.—Trees for the desert, by A. L. Dahl, p. 188-9.

Scribner's magazine, Apr., 1919.—Glacier revealed, by R. S. Yard, p. 385-403.

U. S.—Dept. of agriculture. Journal of agricultural research, Feb. 10, 1919.—Injury to Casuarina trees in southern Florida by the mangrove borer, by T. E. Snyder, p. 155-64.

U. S.—Dept. of agriculture. Weekly news letter, Mar. 26, 1919.—Careful nursing and protection needed by trees being grown for shelter belt, p. 3.

U. S.—Dept. of agriculture. Weekly news letter, Apr. 2, 1919.—Would honor war heroes on arbor day this year, p. 1-2.

U. S.—Dept. of agriculture. Weekly news letter, Apr. 16, 1919.—Army's aircraft will help to combat fires in forests, p. 1-2.

Washington historical quarterly, Oct., 1918.—Western spruce and the war, by E. S. Meany, p. 255-8.

Trade journals and consular reports

American lumberman, Mar. 22, 1919.—Status and future of the crosstie supply, p. 33, 58.

American lumberman, Mar. 29, 1919.—How to build a poultry house, by R. S. Whiting, p. 38K-L.

American lumberman, Apr. 5, 1919.—Lumber prospects in Russia, by R. E. Simmons, p. 42-3; Logging the "Black forest" of France, by J. B. Woods, p. 50, 69; Where the logging truck is coming into its own, p. 60-1.

American lumberman, Apr. 12, 1919.—The organization of lumber export agencies, by J. R. Walker, p. 66-7.

Canada lumberman, Apr. 1, 1919.—More efficient protection of our timber, by J. B. Harkin, p. 32.

Disston crucible, Mar., 1919.—Kauri timber, by C. N. Spiller, p. 23-5.

Electric railway journal, Feb. 15, 1919.—Tie renewal cost reduction deserves serious study, by R. C. Cram, p. 308-15.

Engineering news-record, Mar. 27, 1919.—Zinc as an alternative for creosote in treating railway ties, p. 609; Decay of timber in Mexican low coastal plains, by J. D. Mathews, p. 631-2.

Engineering news-record, Apr. 10, 1919.—Wood construction feature of Charleston port terminal, by H. Abbott, p. 702-6. Gas age, Jan. 15, 1919.—Carbonization of wood in the Stockholm gas works, p. 74-6.

Hardwood record, Mar. 25, 1919.—Invention of rotary veneer, p. 24.

Hardwood record, Apr. 10, 1919.—Estimated lumber cut in 1918, p. 30a.

Lumber, March. 24, 1919.—U. S. faces tie famine, p. 15; Primitive mill in southern forest, p. 43.

Lumber, Apr. 7, 1919.—Lumber trade opportunity in England, by J. Y. Dunlop, p. 43-4.

Lumber, Apr. 14, 1919.—Timber tests made by Uncle Sam, by A. L. Dahl, p. 15-17.

Lumber world review, Mar. 25, 1919.—Logging and lumbering in France, by F. R. Barns, p. 21-5.

Lumber world review, Apr. 10, 1919.—A permanent timberland policy for the U. S., by A. B. Recknagel, p. 26-8.

Mississippi Valley lumberman, Apr. 4, 1919.—Hints on storing timber to prevent decay, p. 23.

Municipal journal, Feb. 22, 1919.—Wood block pavements at Lakewood, by E. A. Fisher, p. 162-3.

New York lumber trade journal, Apr. 1, 1919.—Report of Committee on forestry of the National wholesale lumber dealers' association, p. 42-3.

Paper, Mar. 19, 1919.—Australian papermaking woods and fibers, p. 11-12, 40.

Paper, Apr. 9, 1919.—Sawdust paper, by R. W. Sindall and Bacon, p. 14.

Paper mill, Mar. 22, 1919.—Conditions of labor and wages in the French paper industry, p. 48.

Paper mill, Apr. 5, 1919.—Bark for tanning purposes, p. 27.

Paper trade journal, Mar. 20, 1919.—Manufacture of pulp and paper from garbage, p. 40; Labor and wages in French paper industry, p. 42.

Paper trade journal, Mar. 27, 1919.—Proposed classifications for forest commodities, p. 10, 12, 14.

Paper trade journal, Apr. 10, 1919.—Imports and exports of Japanese paper and pulp, p. 46, 56.

Pioneer western lumberman, Mar. 15, 1919.—Forests of Japan, p. 11; Results of mill scale study of fire-killed timber, by D. C. Birch, p. 15-17.

Pioneer western lumberman, Apr. 1, 1919.—Will improve national forest ranges in Oregon and Washington, p. 11; Caterpillars destroy oak foliage, p. 19.

Pulp and paper magazine, Mar. 6, 1919.—Distribution of electrical power in pulp and paper mills, by E. B. Wardle, p. 237-9.

Railway age, Mar. 28, 1919.—Waterproofing railway ties to preserve them, by H. K. Wiscteed, p. 849-50.

Railway mechanical engineer, Feb., 1919.—Lumber for car construction, by H. von Schrenk, p. 85-8.

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Railway review, Apr. 12, 1919.—Fire control in forests, by J. A. Kitts, p. 550-1, 555-6.

Southern lumberman, Mar. 22, 1919.—Louisiana lumbermen hold conference on prevention of forest fires, p. 30; Great days ahead for American lumbermen, by N. C. Brown, p. 33; France and her lumber stocks, by J. B. Woods, p. 36.

Southern lumberman, Apr. 5, 1919.—Santo Domingo is not a lumberman's Paradise, p. 30.

Timber trades journal, Mar. 22, 1919.—Australia timber, p. 482.

Timber trades journal, Mar. 29, 1919.—Afforestation by the government, by A. D. Webster, p. 487.

Timberman, Mar., 1919.—Tie mills protest centralized buying methods, p. 38-9; Fight to keep blister rust out of the west, p. 40-1; Manufacture of continuous wood stove pipe, p. 45; European import duties on lumber, p. 67-8.

U. S. commerce report Mar. 24, 1919.—White-pine timber resources of New Zealand, p. 1460-1.

U. S. commerce report, Mar. 31, 1919.—Swedish forests an important resource, p. 1614.

U. S. commerce report, Apr. 8, 1919.—The paper industry in Japan, p. 164-77; Samples of Ecuadorian woods, p. 187.

U. S. commerce report, Apr. 9, 1919.—Review of Swedish wood-pulp market during 1918, p. 216-18.

Veneers, Apr., 1919.—Red gum as a cabinet wood, by I. B. Handy, p. 14-15.

West Coast lumberman, Mar. 15, 1919.—How to dry western red cedar to avoid collapse, by H. D. Tieman, p. 22, 31.

West Coast lumberman, Apr. 1, 1919.—Forest resources of New South Wales, by B. Millin, p. 35; Average price since 1897 on nine leading fir items, p. 37; Crimps, their cause and cure, by A. Smith and N. Jones, p. 42-3; Manual of the western lumber industry, p. 49-64; Pacific Coast water shipments for past quarter century, p. 66-9; Methods of measuring and terms used by Swedish lumber exports in the European market, by H. Sylven, p. 70-1; Webb law and its relation to the export lumber trade, by W. Compton, p. 72; Rigging cableway logging systems, by J. T. Worsley, p. 74-5, 78-9, 136, 140; Mill owners throw money away by neglecting dry kilns, by V. G. Gilbreath, p. 85; Recommendations for the inspection of logging camps, by A. B. Wastell, p. 92-4; Japan's shipyards closing, by G. H. Scidmore, p. 96; Sawyers' and setters' signs, p. 97; War period trying time for British Columbia lumbermen, by T. J. McElveen, p. 103-4; How to easily distinguish Douglas fir from Sitka spruce lumber, p. 108; The human equation in the lumber industry, by R. W. Vinnedge, p. 114-15, 123; Cost keeping, by J. P. Robertson, p. 116, 187; Trade commission expert discusses cost accounting, by L. H. Haney, p. 118, 122; Story of how the government makes woods more useful, p. 121, 144, 198; Overhead skidders in fir timber, p. 154; How to choose a rope for any given purpose, p. 159-60; Will use much native timber, p. 185.

Wood-Workers, Mar., 1919.—English methods of lumber driving, by J. Young, p. 34.

Forest journals

American forestry, Apr., 1919.—French forests for our army, by P. S. Ridsdale, p. 963-72; Cascara stumpage advertised on Suislaw, p. 972; Wooden boats and their manufacture, by H. Maxwell, p. 973-82; Forest opportunity on pine lands in the south, by F. W. Besley, p. 983-4; Washington's first memorial tree, p. 984; Forward with tree planting, by C. L. Pack, p. 985-90; Why wood is best, by A. Gaskill, p. 991-4; Mandrakes, wild lupine, and notes on the American snapping turtle, by R. W. Shufeldt, p. 995-1000; Rails, gallinules and coots, by A. A. Allen, p. 1001-5; Southwestern forest supervisors hold important conference, p. 1005; The pine woods folks, by E. G. Cheyney, p. 1006-7; Digest of opinions on forestry, p. 1008; Walks in the woods, by J. O. Swift, p. 1009-11; Sell fuel wood by weight, p. 1012; Canadian department, by E. Wilson, p. 1015-16; Training courses in wood inspection, p. 1016; Forestry in Louisiana, p. 1018; Planting trees in a new way, p. 1918.

Allegemeine forst—und jagdzeitung, July, 1918.—Darstellung des verhaltens der holzarten zum wasser, by Anderlind, p. 125-8; Beobachtungen uber blitzschlage, by Joseph, p. 141-2.

Allgemeine forst—und jagdzetiung, Aug., 1918.—Zur harznutzung im jahre 1917, by Biehler, p. 149-65.

Allgemeine forst—und jagdzeitung, Sept.-Oct., 1918.—Ueber einsparungen biem pflanzbetriege, by Tiemann, p. 173-81.

Australian forestry journal, Feb. 10, 1919.—Putting first-class woods to third-class purposes, p. 43-4; Axe and other handles, p. 44-5; The excessive cost of logging, by F. Nixon, p. 47-8; White ants in cypress pine, by G. Burrow, p. 48-9; Forestry in central Africa, by A. S. Le Souef, p. 49-50; Forestry and land settlement; a New Zealand view, p. 57-8; Some common fallacies; Australian timber resources, by H. R. Mackay, p. 59-62; The eternal fire question, by R. D. H., p. 64, 66.

Canadian forestry journal, Mar., 1919.—A civic plan for street trees, by B. R. Morton, p. 106-8; Photographing forests from the air, by Lewis, p. 110-12; Lumbermen and the tree supply, by W. G. Power, p. 115-17; Does the west need forests, p. 118-20; The waste of Christmas tree export, by

J. A. Bothwell, p. 121; Victoria launches into state forestry, by H. R. MacMillan, p. 124-5; The probable cost of aeroplane patrol, p. 126-7; Guarding 21 million acres by co-operation, p. 130.

Forest leaves, Apr., 1919.—Memorial trees, by J. T. Rothrock, p. 17-18; Spring arbor day proclamation, p. 19; Pocono protective fire association, p. 19; The white pine blister rust situation, p. 25-6.

Journal of forestry, Mar., 1919.—The work ahead, by F. E. Olmsted, p. 227-35; The organization of finance in forest industry, by B. P. Kirkland, p. 236-44; Review of lumber industry affairs, by P. S. Lovejoy, p. 245-59; Forest research and the war, by E. H. Clapp, p. 260-72; Some aspects of silvical research as an after-the-war activity, by C. Leavitt, p. 273-80; Need for a unified forest research program, by J. W. Toumey, p. 281-9; Some reflections upon Canadian forestry problems, by C. D. Howe, p. 290-96; Preliminary report of some forest experiments in Pennsylvania, by J. S. Illick, p. 297-311; Measuring cordwood in short lengths, by R. C. Hawley, p. 312-17.

Naturwissenschaftliche zeitschrift fur forts—und landwirtschaft, Jan.-Feb., 1918.—Stand und aussichten der harznutzung, by C. von Tubeuf and others, p. 1-99.

Naturwissenschaftliche zeitschrift fur forst—und landwirtschaft, Mar.-Aug, 1918.—Zur kiefernharznutzung 1918, by Schepss, p. 105-18; Ueber die kiefern-dreher Melampsora pinitorqua, by N. Sylven, p. 118-27; Die nordschwedische kiefer, by N. Sylven, p. 128-38; Ueber die verbreitung der mistel in der Schweiz, by J. W. F. Coaz, p. 138-95; Die insekten der mistel und verwandter Loranthaceen, by F. Schumacher, p. 195-238; Buchelernte in sicht, by Gareis, p. 246-60; Buchenund fichtensamenernte im jahre 1918, by C. von Tubeuf, p. 260-4; Unsere alleen und alleebaume, by C. von Tubeuf, p. 264-80; Die ubergang des rindenblasenrostpilzes Peridermium pini, von kiefer zu kiefer, by C. von Tubeuf, p. 280-82.

North woods, Feb., 1919.—Prevention of forest fires in Minnesota, by A. P. Silliman, p. 3-9; Forestry legislation, p. 26-32.

Ohio forester, Jan., 1919.—An undeveloped profession, by J. S. Houser, p. 4-6; Tamarack for fence posts, by J. J. Crumley, p. 6-7; The outlook for forestry, by E. Secrest, p. 8-12; Once upon a time, by E. T. Owen, p. 12-17.

Revue des eaux et forets, Mar. 1, 1919.—L'administration des eaux et forets pendent la guerre, p. 45-52; La conversion en futaie et l'oidium, by F. Doe, p. 53.

Schweizerische zeitschrift fur forstwesen, Jan.-Feb., 1919.—Ueber einige im botanischen garten in Gern kulitvierte schlangenfichten, by E. Fischer, p. 10-12; Ist der holzwert eines waldes als gemeindevermogen den fondsgeldern gleichzustellen, by C. Helbling, p. 13-15; Favolus europaeus Fr., ein schadling des nussbaumes, by E. Paravicini, p. 15-17; Die brennholzversorgung im Kanton Zurich, by H. Fleisch, p. 27-30.

Skogsvardsforenningens tidskrift, Jan., 1919.—Naturforskningen och de skogsbiologiska problemen (Nature studies and the problem of forest biology), by H. Hesselman, p. 3-11; De Oelandska skogsmarkernas produktionsformaga (The productivity of the forest soil of Oeland), by U. Danielson, p. 12-18; Om uppskattning av hojdtillvaxten a staende trad (Estimating the height growth of standing trees), by S. Petrini, p. 19-24.

Yale forest school news, Apr. 1, 1919.—A look ahead, by S. T. Dana, p. 22-4.

Zeitschrift fur forst- und jagdwesen, Aug., 1918.—Massenschatzung und bestandesbeschreibung im urwalde, by A. Schwappach, p. 350-5; Die wirtschaftliche entwisklung eines litauischen reviers, by H. Musser, p. 355-68.

Zeitschrift fur forst- und jagdwesen, Sept., 1918.—Wald und feld, by Merten, p. 385-400; Untersuchungen uber den festgehalt und das gewicht des eichenholzes, by C. Trost, p. 401-16; Die larche, by Eberts, p. 416-18; Zum larchen-ratsel, by H. Muller, p. 418-21; Ueber die bedeutung und vermeidung des eintreibens von eisennageln in lebende baume, p. 421-3; Zueintreibens von eisennageln in lebende baume, p. 421-3; Zufallige gedanken von dem bequemsten raume zum anbau des holzes, ohne nachtheil und beeugung des saat-, weide- und weissenlandes, by C. Kruger, p. 424-30.

Zeitschrift fur forst- und jagdwesen, Oct., 1919.—Waldreinertrag und bodenrente nach erfahrungen der kriegszeit, by Kordvahr, p. 433-41; Zwei Duesberg'sche kiefern im forstlichen museum, p. 468-74.

Zeitschrift fur forst- und jagdwesen, Nov., 1918.—Vorlaufiger bericht uber die ergebnisse von kieferndungungsver-suchen in der Warener stadtfort, by Geist, p. 481-6; Mitteilungen aus der waldsamenprufungsanstalt Eberswalde, by A. Schwappach, p. 487-90; Ueber den frass der raupe von Aglia tau L. an roteiche, by A. Krausse, p. 490-3; Jahrring und licht, by Oelkers, p. 493-511; Bemerkung im forsthaushalt, by C. Kruger, p. 511-19.

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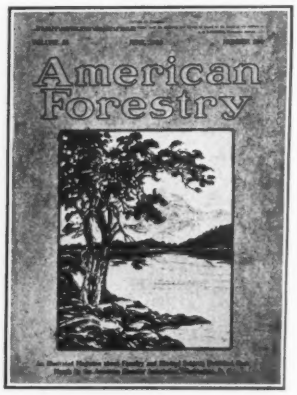

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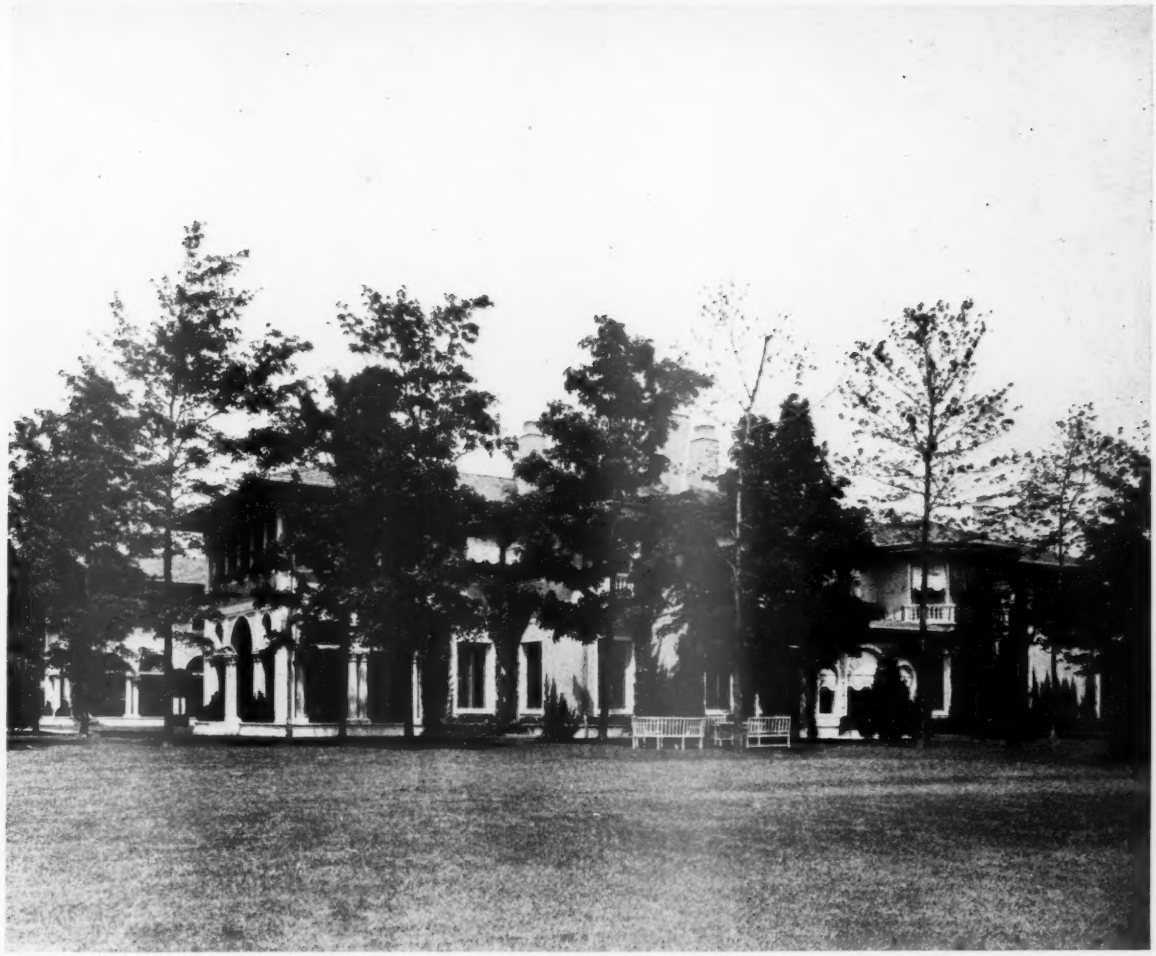

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